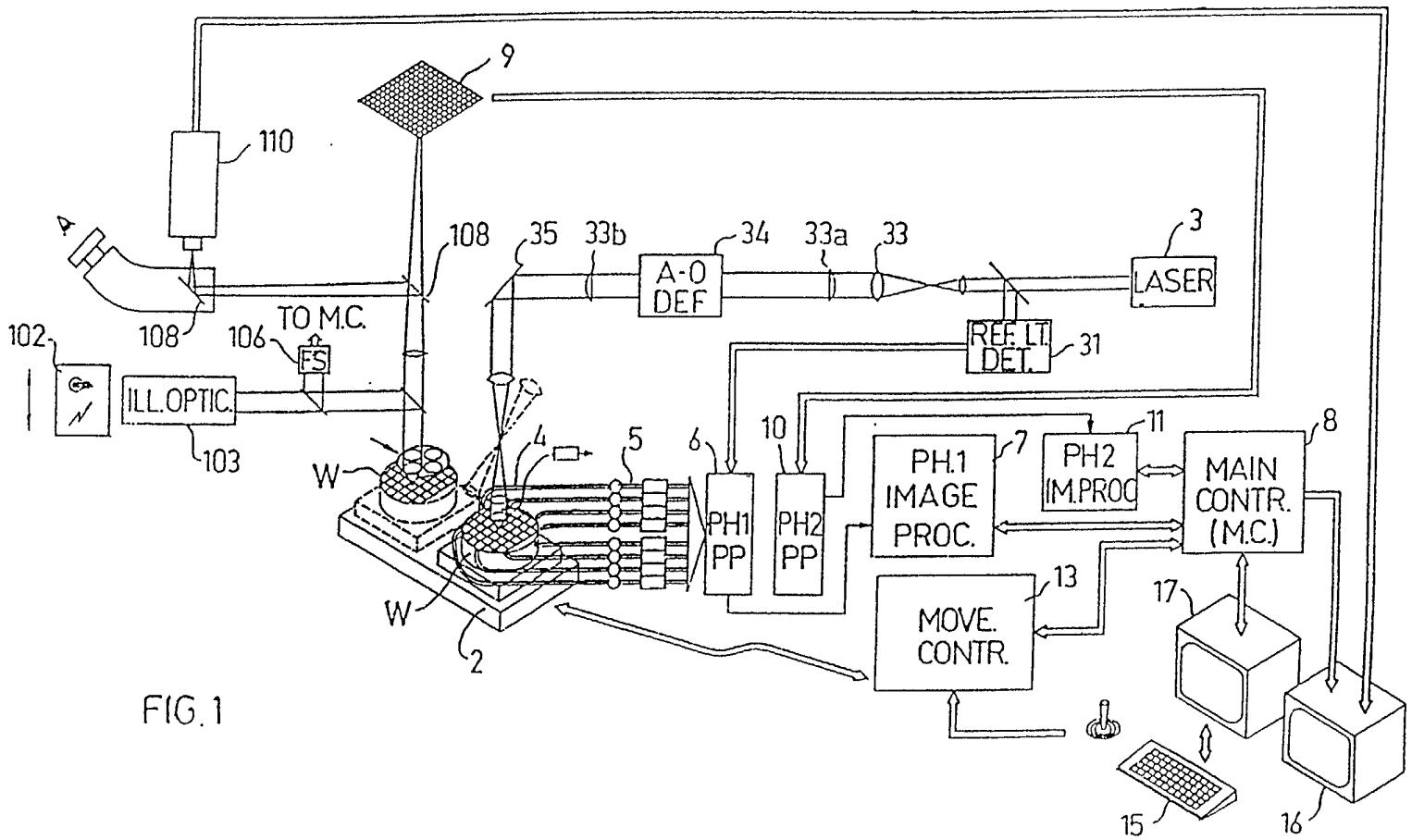

9
110
4
108
35
33b
34
33a
33
3
A-O DEF
LASER
108
TO M.C.
106
FS
102
REF. LT. DET.
31
ILL.OPTIC.
103
W
4
5
6
10
PH1 PP
PH2 PP
PH.1 IMAGE PROC.
7
PH2 IM.PROC
11
MAIN CONTR. (M.C.)
8
W
2
MOVE. CONTR.
13
17
15
16

FIG. 1

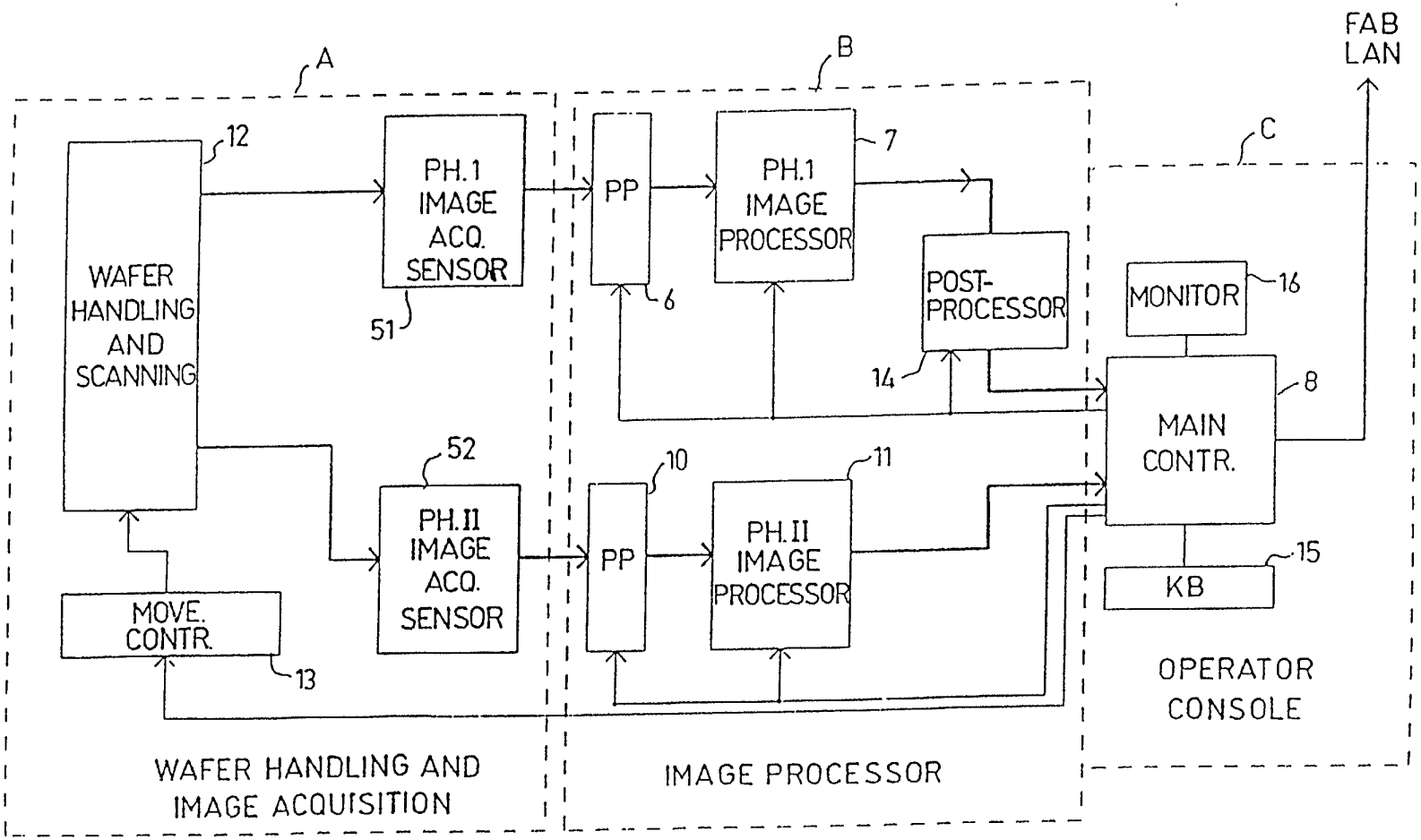

A
B
C
FAB LAN
12
WAFER HANDLING AND SCANNING
PH.1 IMAGE ACQ. SENSOR
51
PP
6
PH.1 IMAGE PROCESSOR
7
POST-PROCESSOR
14
MONITOR
16
MAIN CONTR.
8
52
PH.II IMAGE ACQ. SENSOR
PP
10
PH.II IMAGE PROCESSOR
11
KB
15
MOVE. CONTR.
13
OPERATOR CONSOLE
WAFER HANDLING AND IMAGE ACQUISITION
IMAGE PROCESSOR

FIG. 2

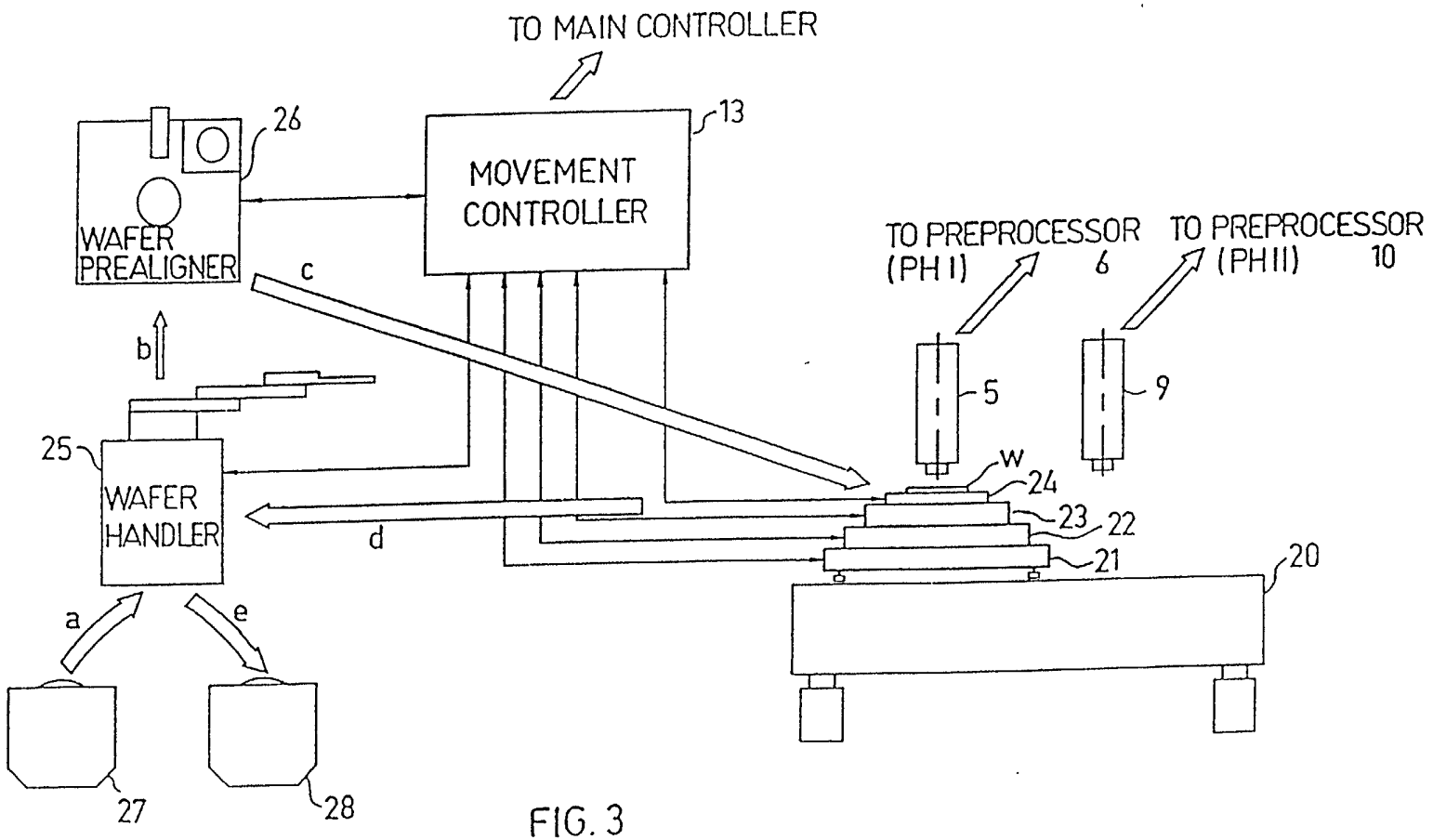
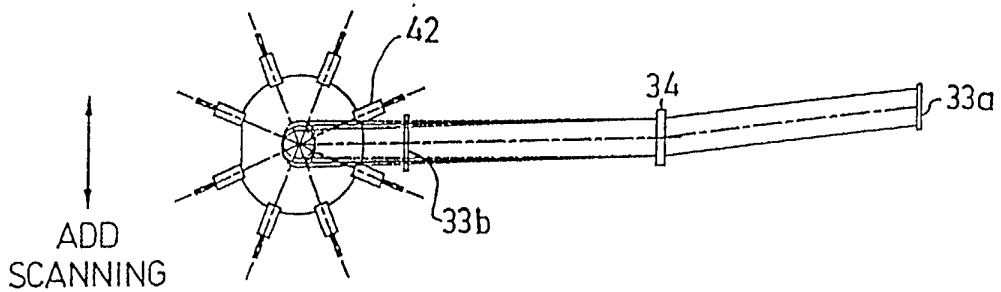

TO MAIN CONTROLLER
13
MOVEMENT CONTROLLER
26
WAFER PREALIGNER
c
b
25
WAFER HANDLER
d
a
e
27
28
TO PREPROCESSOR (PH I) 6
TO PREPROCESSOR (PH II) 10
5
9
W
24
23
22
21
20

FIG. 3

FIG . 5



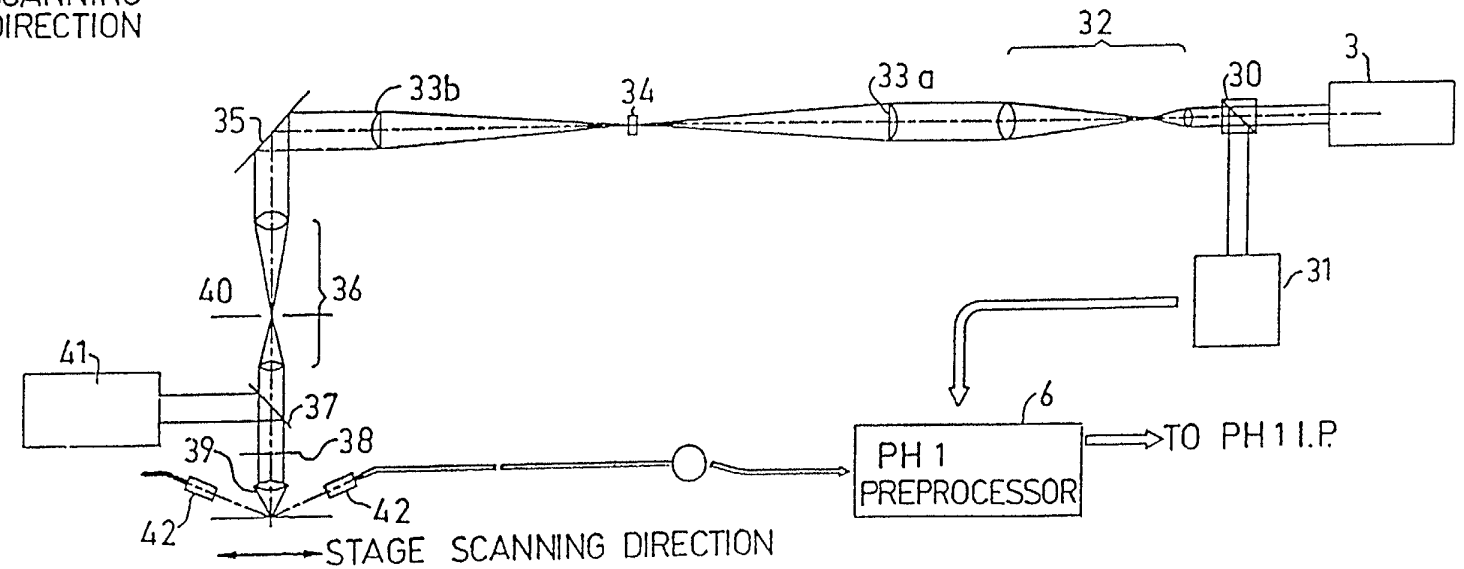


FIG . 4

FIG . 6

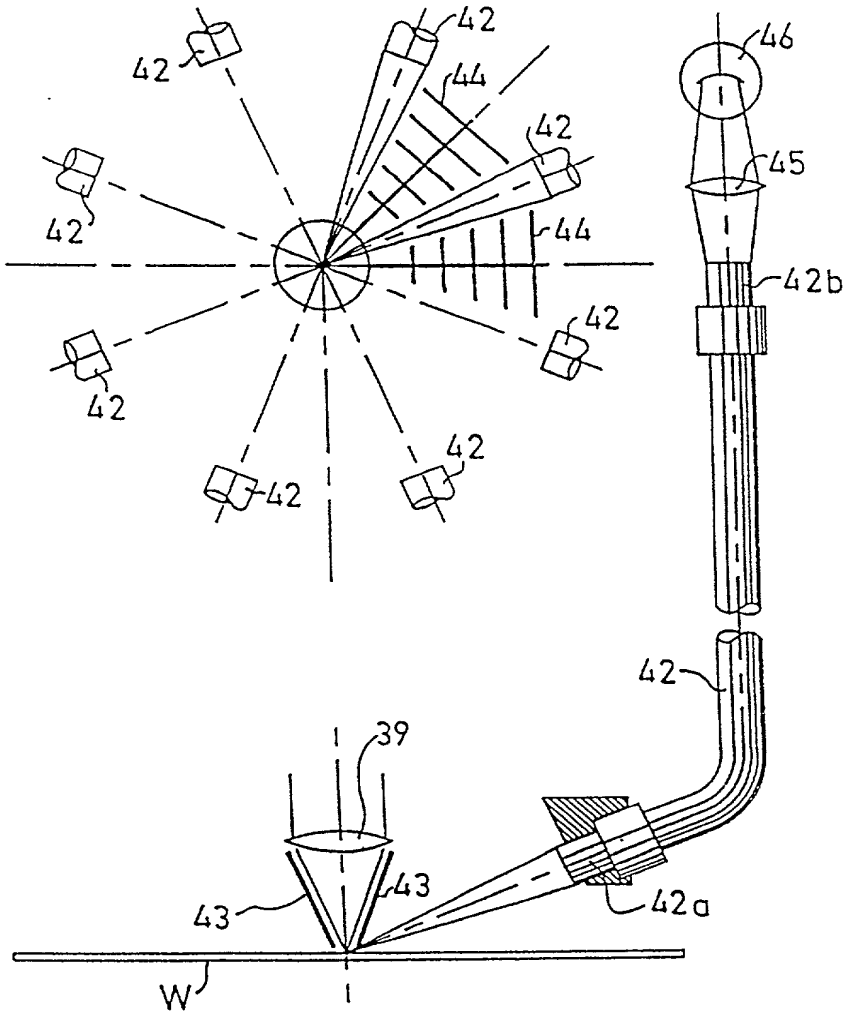


FIG . 7

FIG . 6a

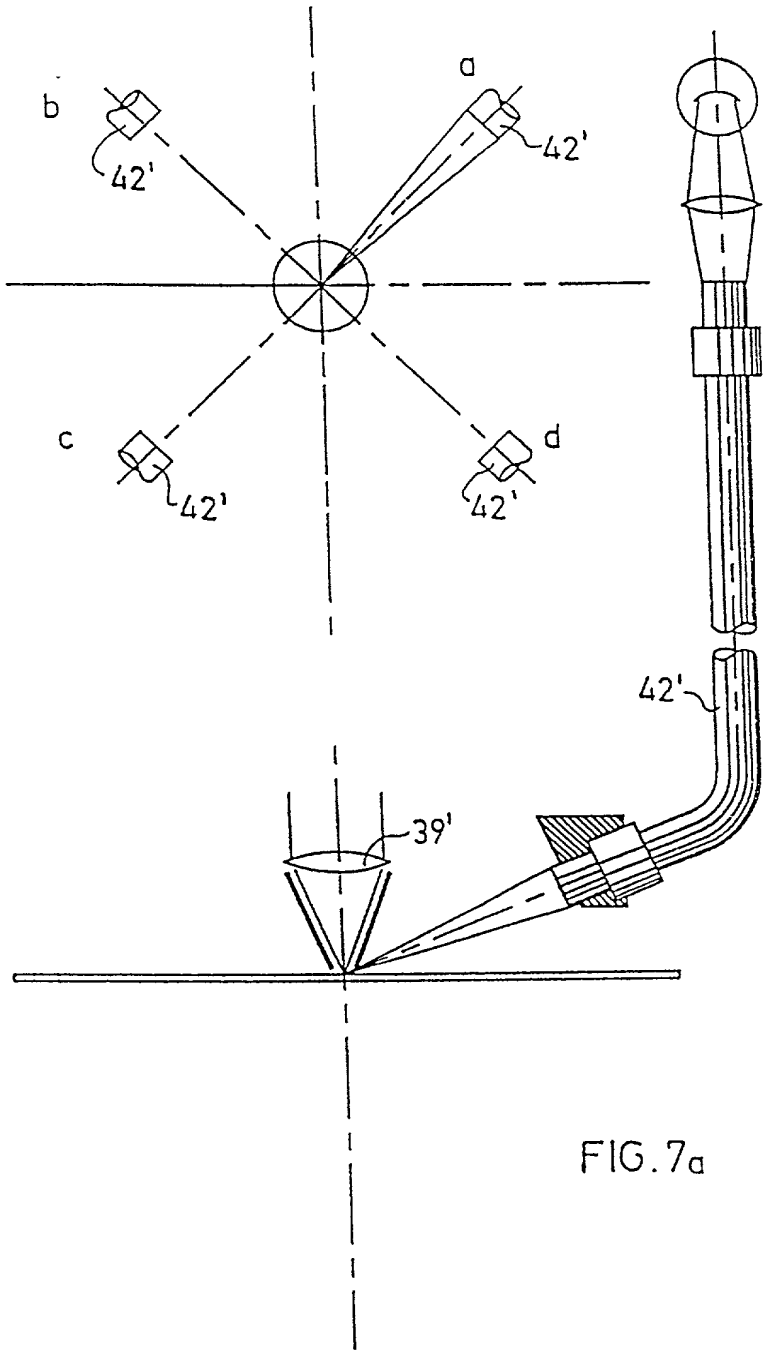


FIG. 7a

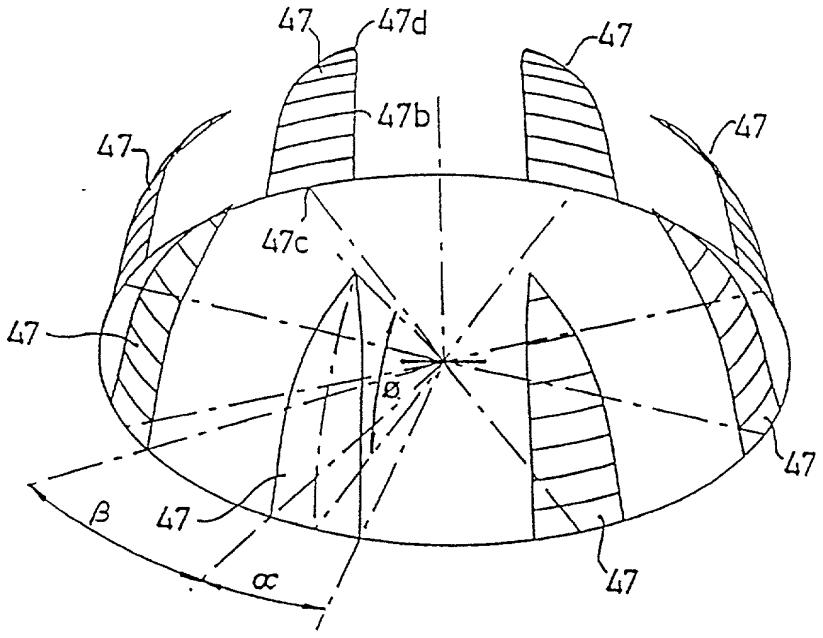

47
47d
47
47b
47
47
47c
47
ø
47
β
47
α
47
AOD SCANNING

FIG 8

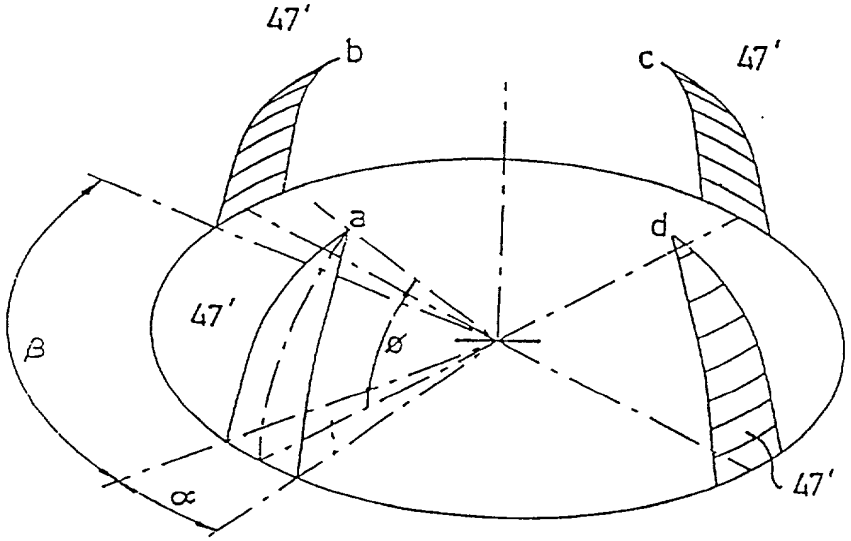
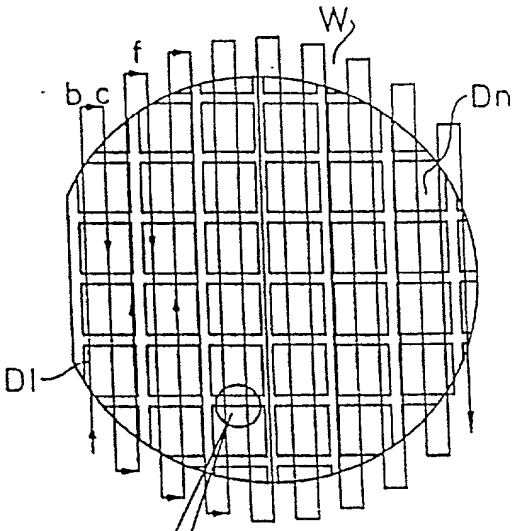

47'
b
c
47'
a
d
47'
β
ø
47'
α
AOD SCANNING

FIG 8a



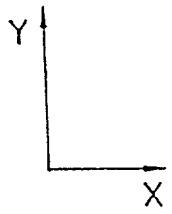


FIG. 9

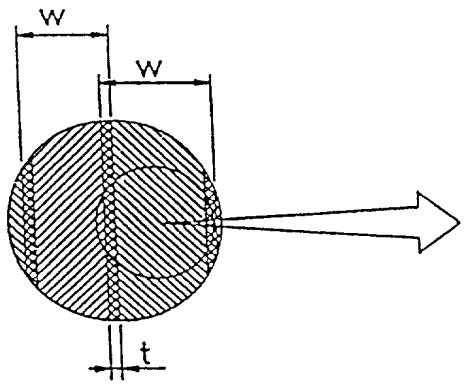


FIG. 10

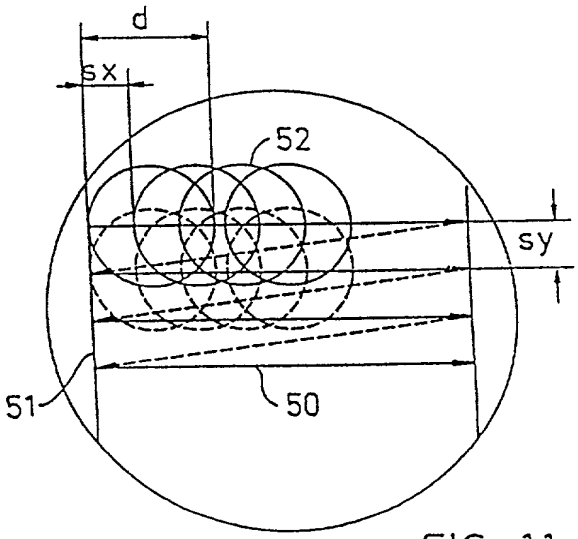


FIG. 11

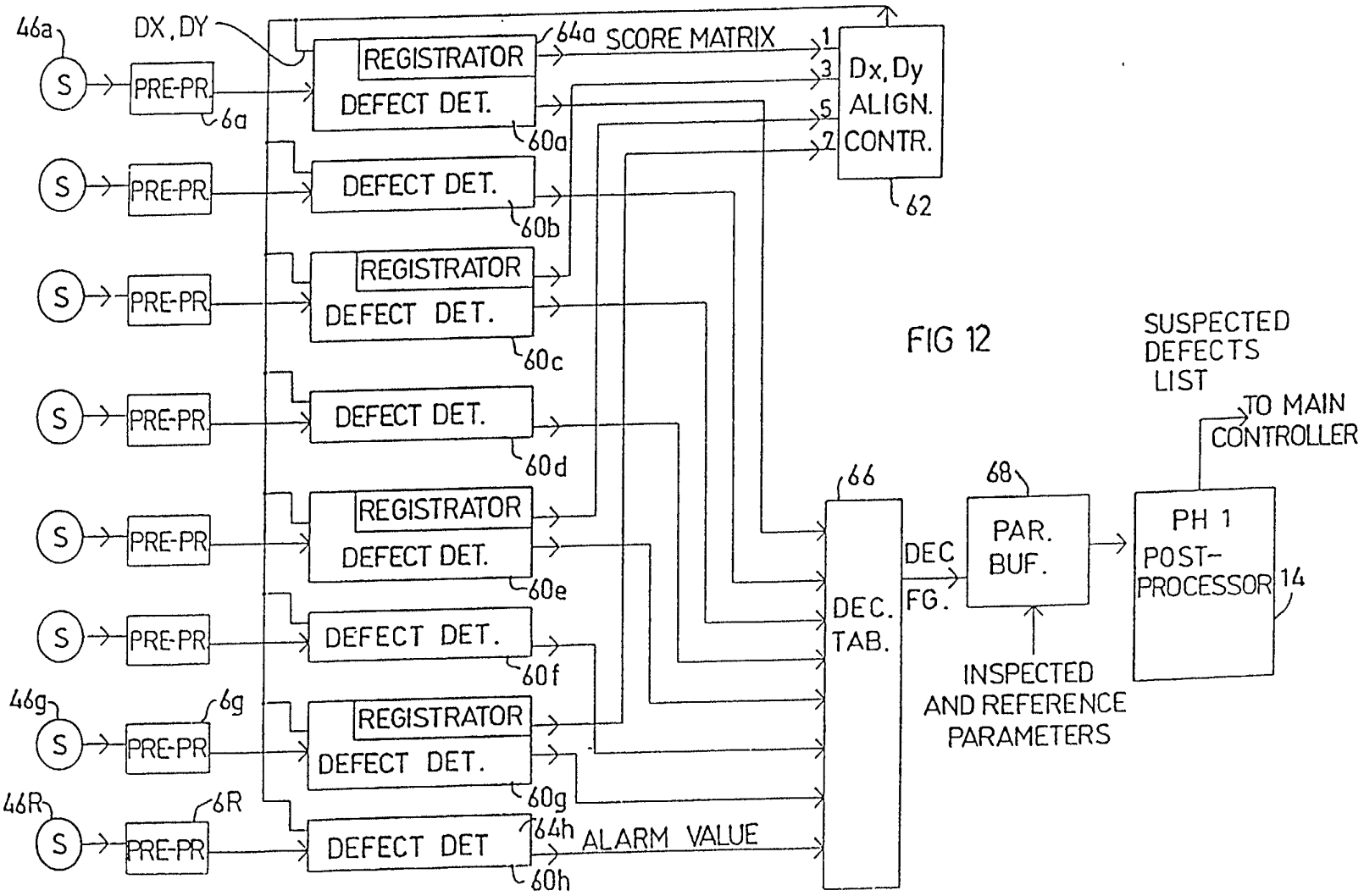

46a
DX, DY
S
PRE-PR
6a
REGISTRATOR
DEFECT DET.
60a
64a SCORE MATRIX
1
3
5
2
Dx, Dy
ALIGN.
CONTR.
62
DEFECT DET.
60b
REGISTRATOR
DEFECT DET.
60c
DEFECT DET.
60d
REGISTRATOR
DEFECT DET.
60e
DEFECT DET.
60f
46g
6g
REGISTRATOR
DEFECT DET.
60g
46R
6R
DEFECT DET
64h
ALARM VALUE
60h
66
DEC.
TAB.
DEC
FG.
68
PAR.
BUF.
INSPECTED
AND REFERENCE
PARAMETERS
PH 1
POST-
PROCESSOR
14
SUSPECTED
DEFECTS
LIST
TO MAIN
CONTROLLER

FIG 12

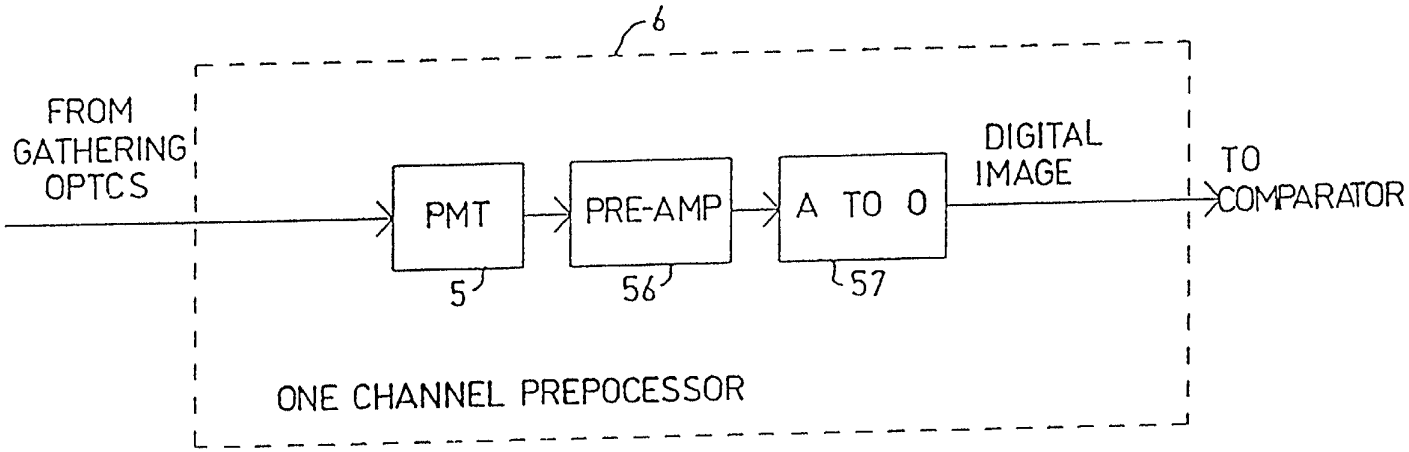

6
FROM GATHERING OPTCS
PMT
5
PRE-AMP
56
A TO O
57
DIGITAL IMAGE
TO COMPARATOR
ONE CHANNEL PREPOCESSOR

FIG . 13

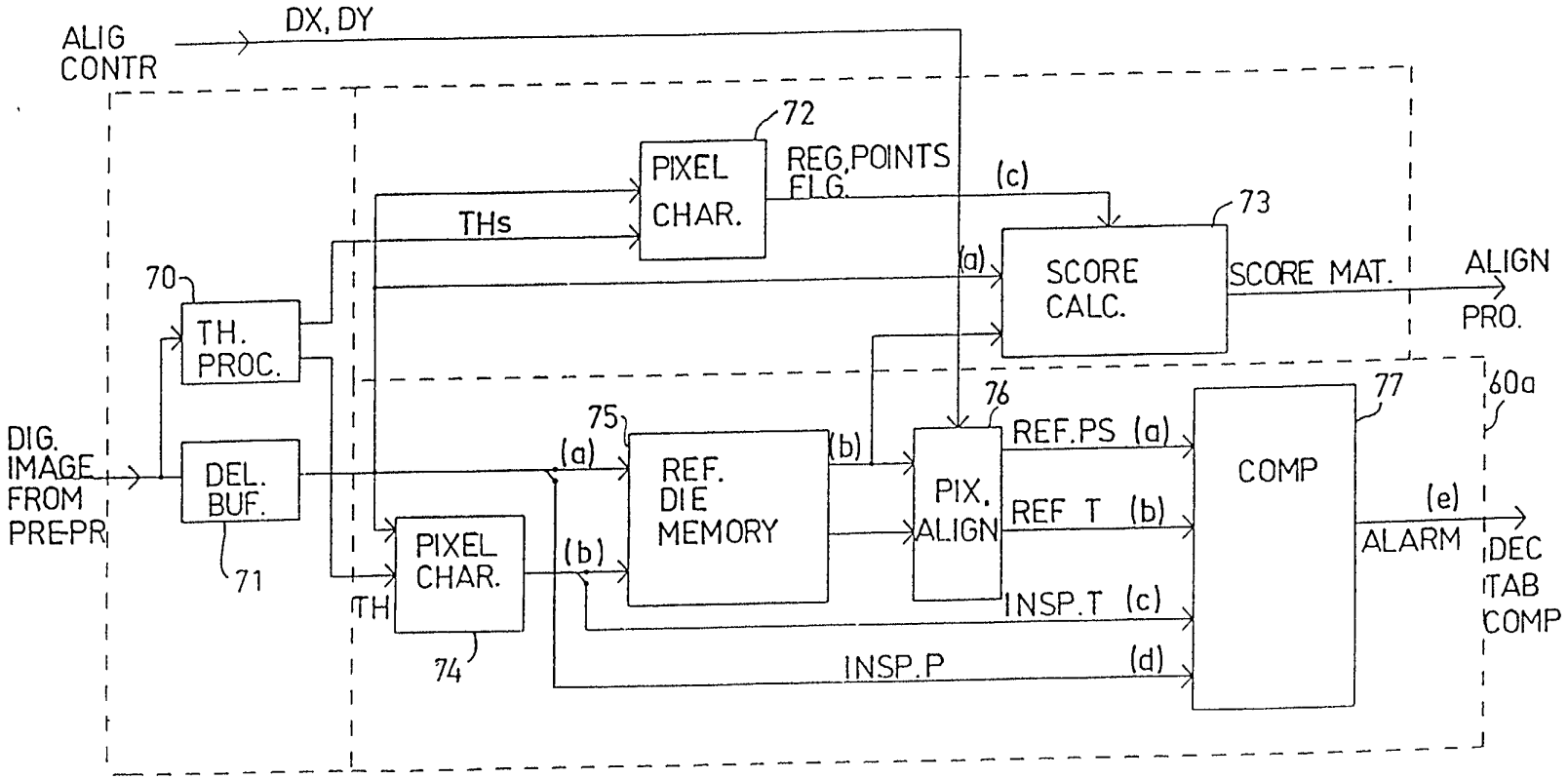


FIG . 14

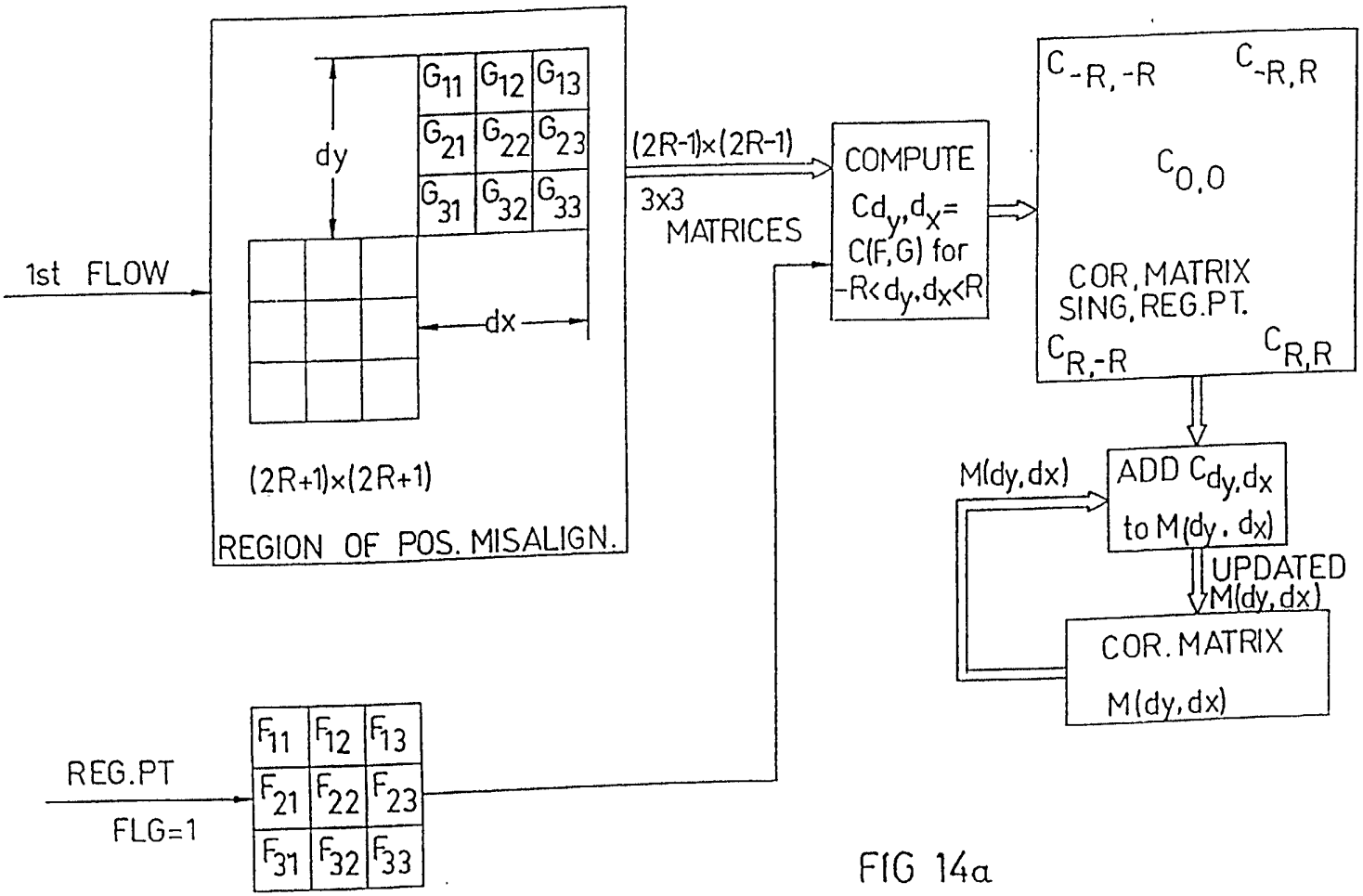


FIG 14a

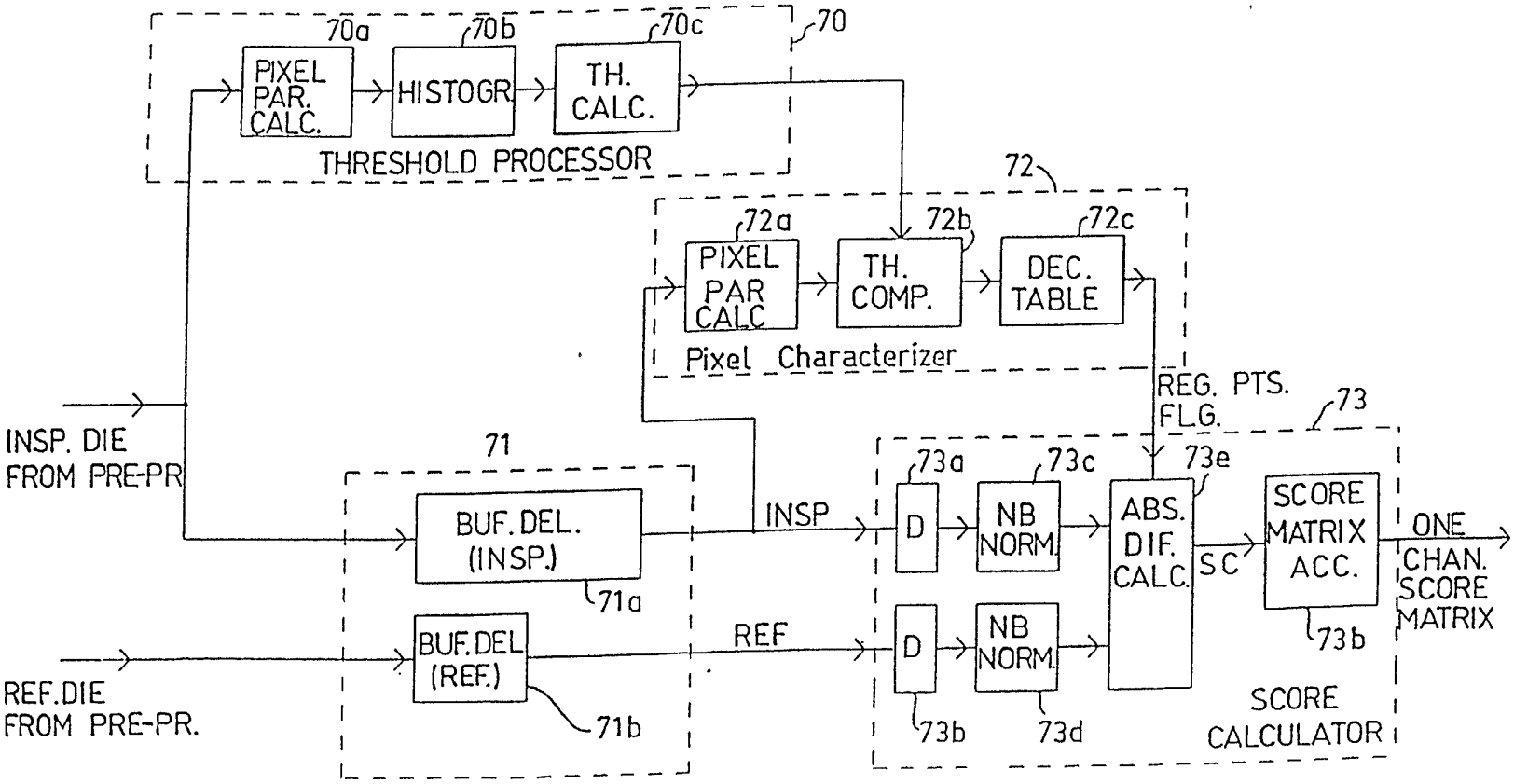


FIG . 15

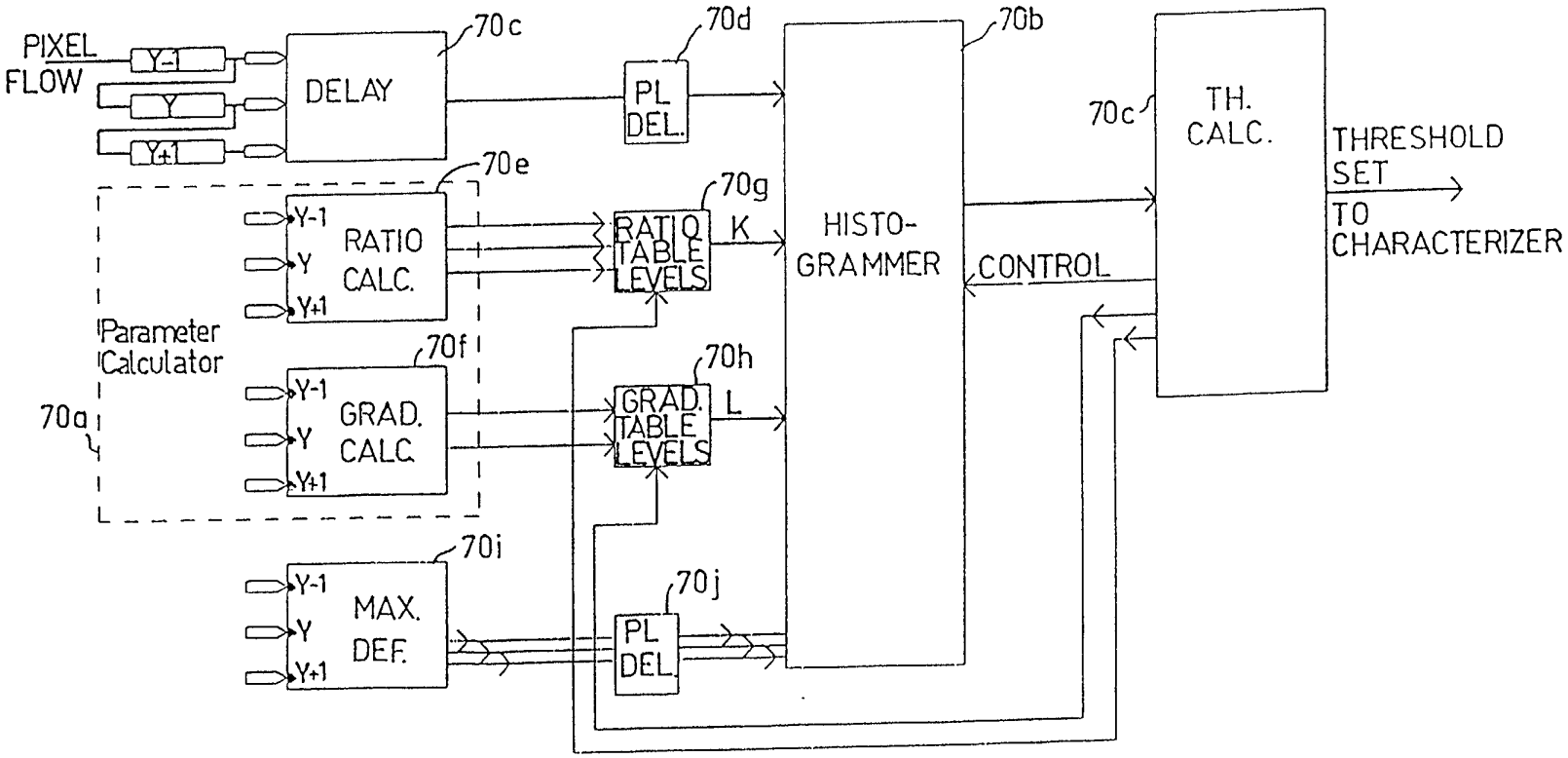


FIG . 16

FIG. 17

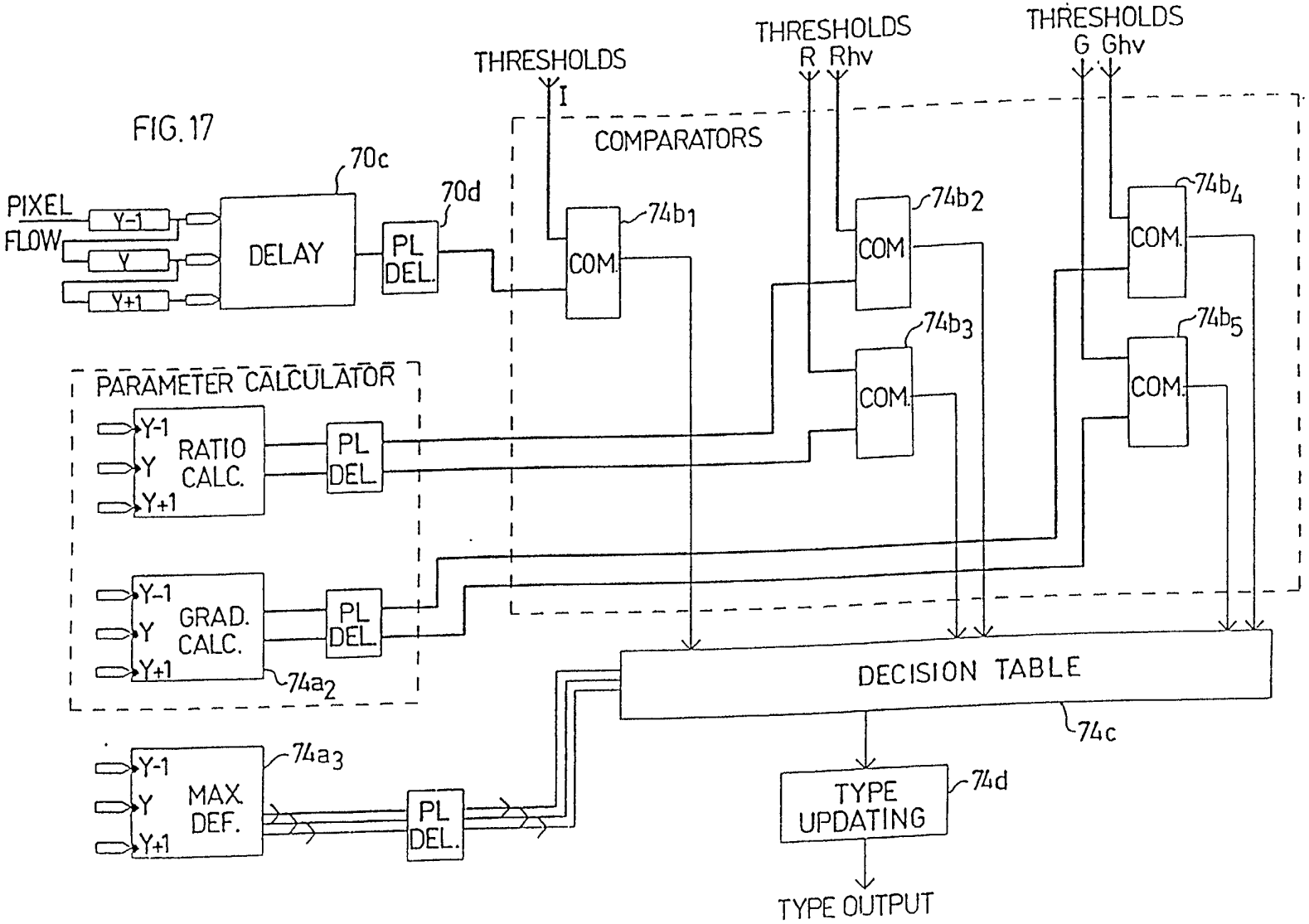


FIG 17a

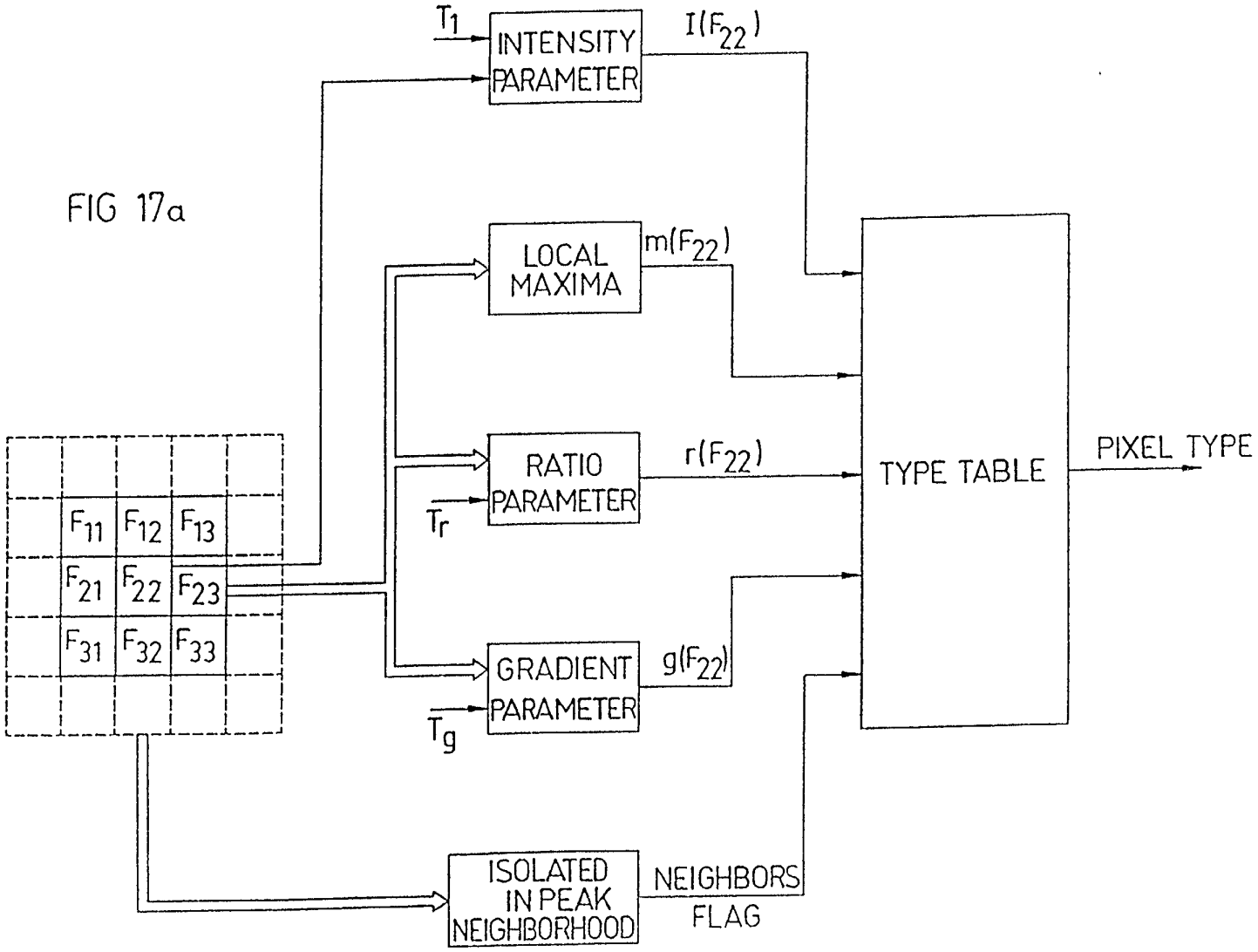


FIG 21a

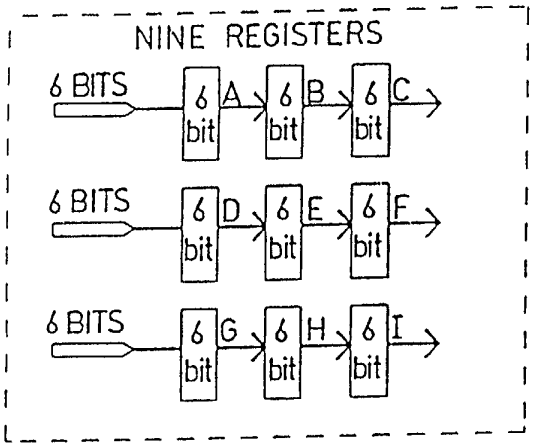
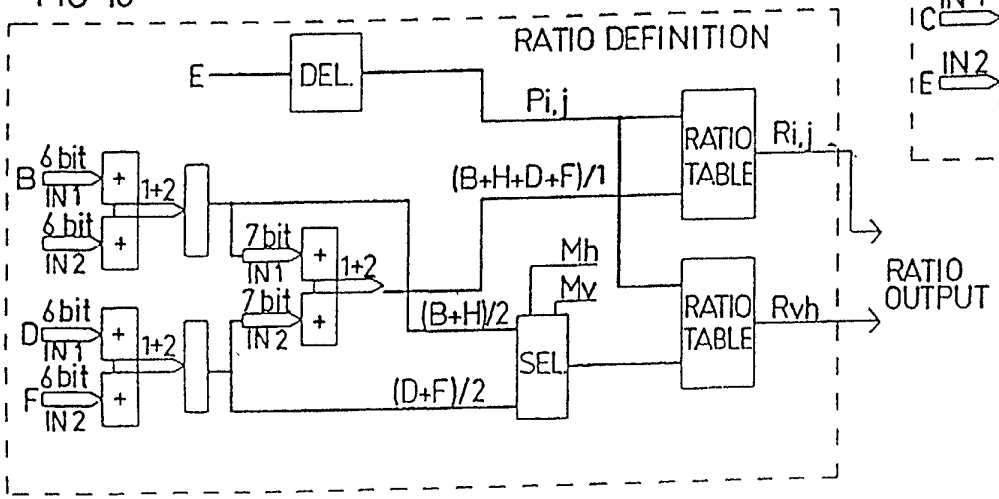


FIG 18



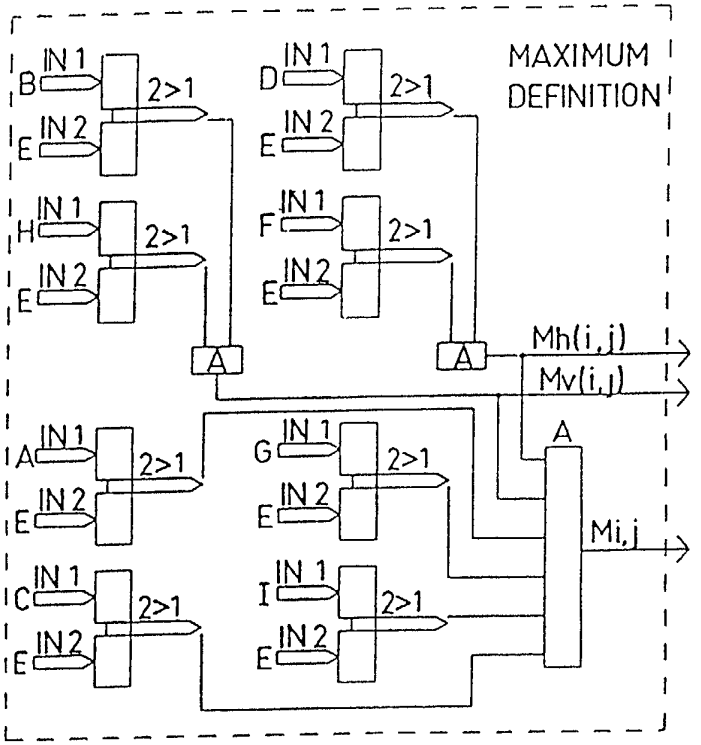


FIG 20

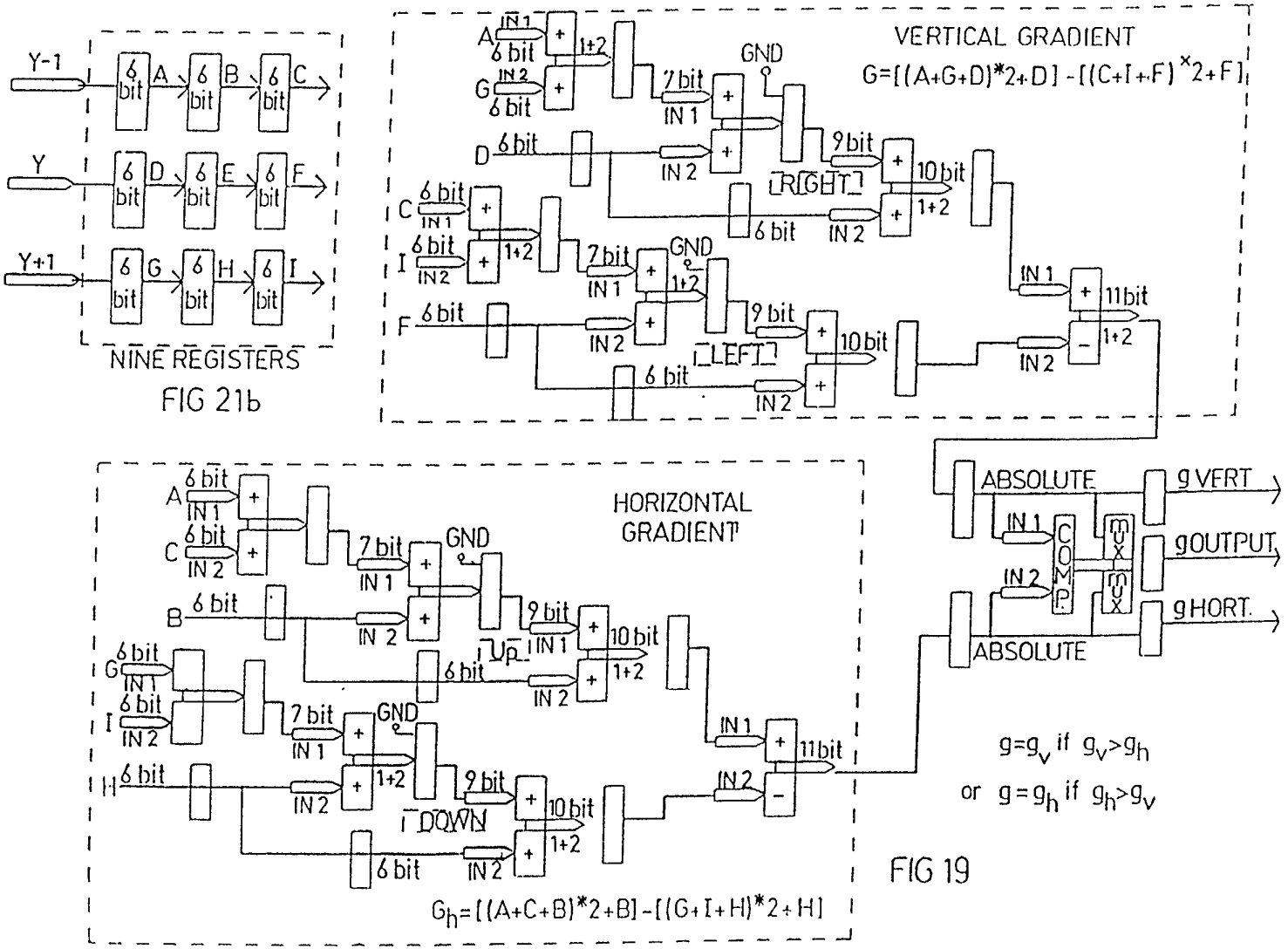


FIG 21b

FIG 19

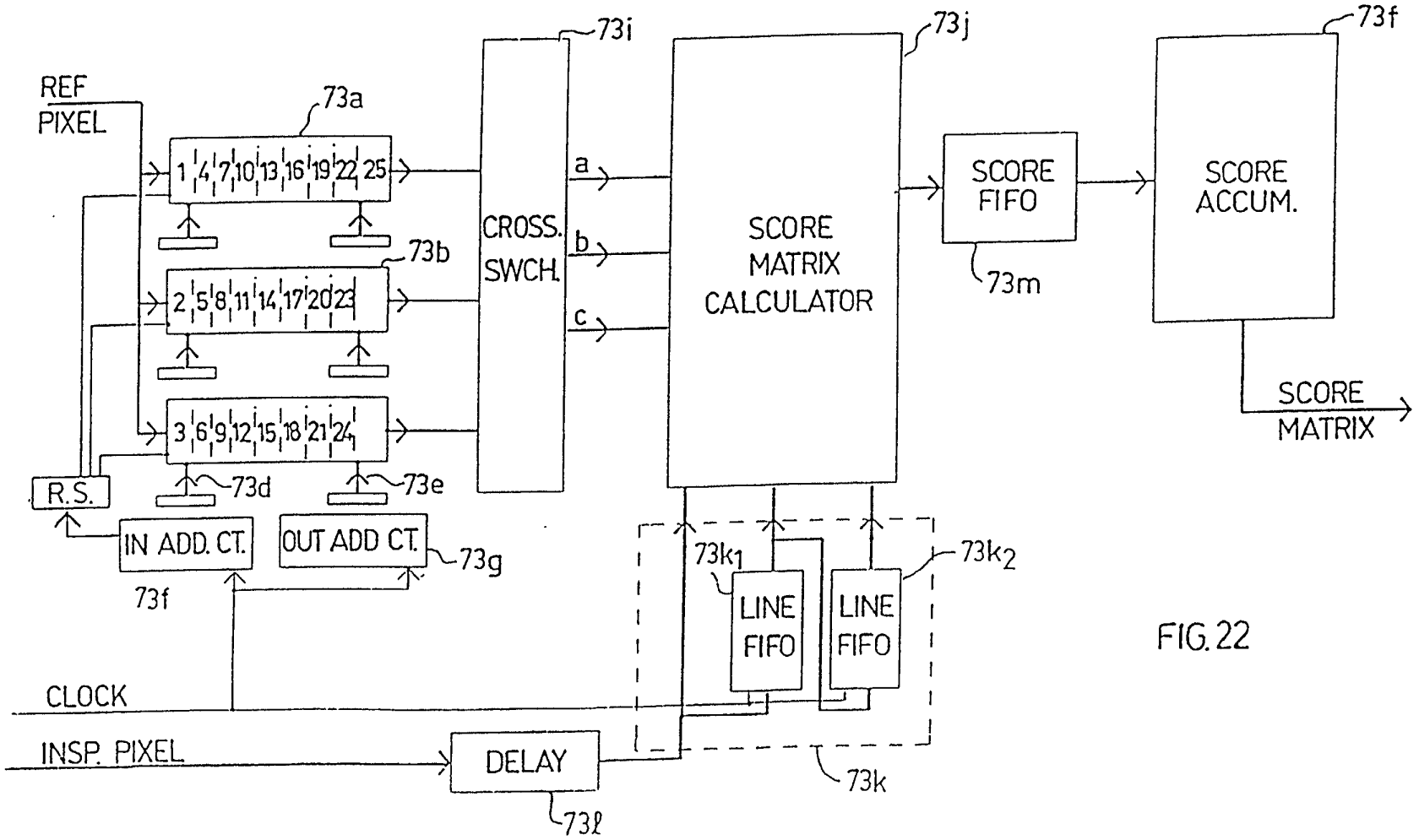

REF PIXEL
73a
1 4 7 10 13 16 19 22 25
2 5 8 11 14 17 20 23
3 6 9 12 15 18 21 24
73b
73d
73e
R.S.
IN ADD. CT.
OUT ADD CT.
73g
73f
CLOCK
INSP. PIXEL
DELAY
73l
CROSS. SWCH.
73i
a
b
c
SCORE MATRIX CALCULATOR
73j
SCORE FIFO
73m
SCORE ACCUM.
73f
SCORE MATRIX
73k1
LINE FIFO
LINE FIFO
73k2
73k

FIG. 22

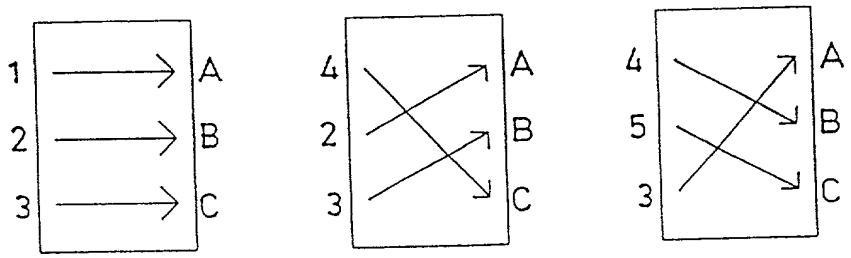


FIG . 22a

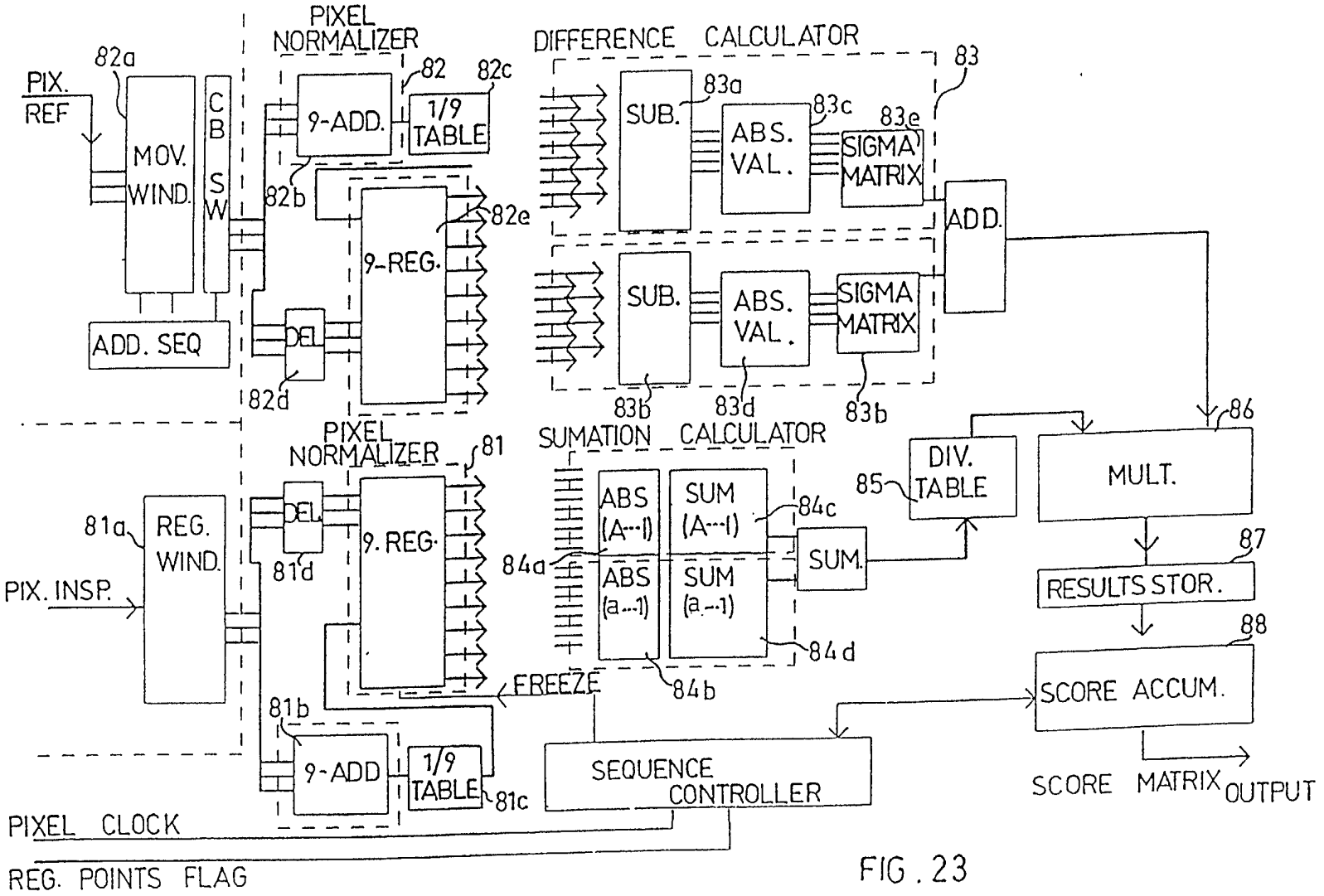


FIG. 23

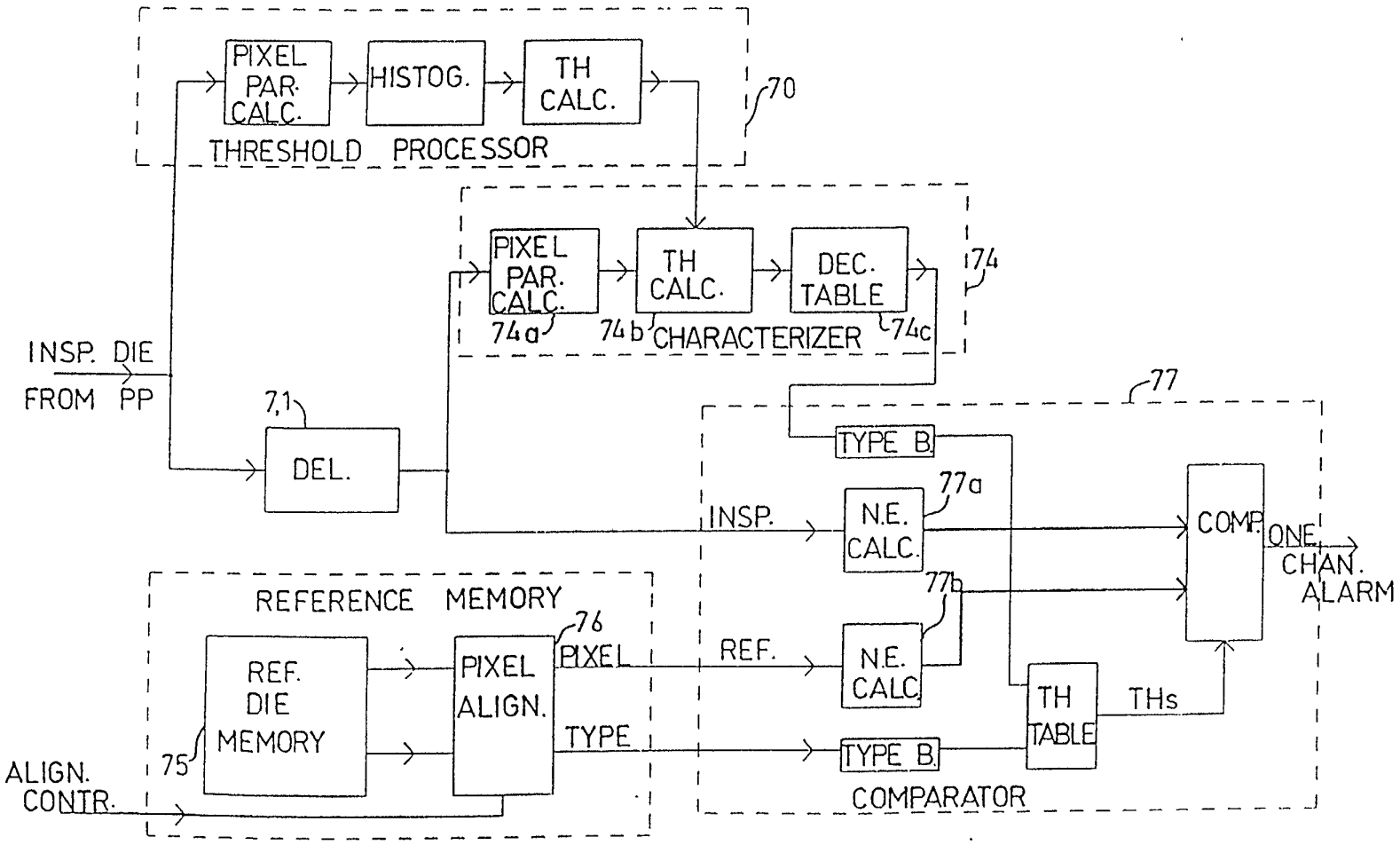

PIXEL PAR. CALC.
HISTOG.
TH CALC.
70
THRESHOLD PROCESSOR
PIXEL PAR. CALC.
TH CALC.
DEC. TABLE
74
74a
74b CHARACTERIZER
74c
INSP. DIE FROM PP
7,1
DEL.
77
TYPE B.
INSP.
N.E. CALC.
77a
77b
COMP.
ONE CHAN. ALARM
REFERENCE MEMORY
76
PIXEL
REF. DIE MEMORY
75
PIXEL ALIGN.
REF.
N.E. CALC.
TH TABLE
THs
TYPE
TYPE B.
ALIGN. CONTR.
COMPARATOR

FIG. 24

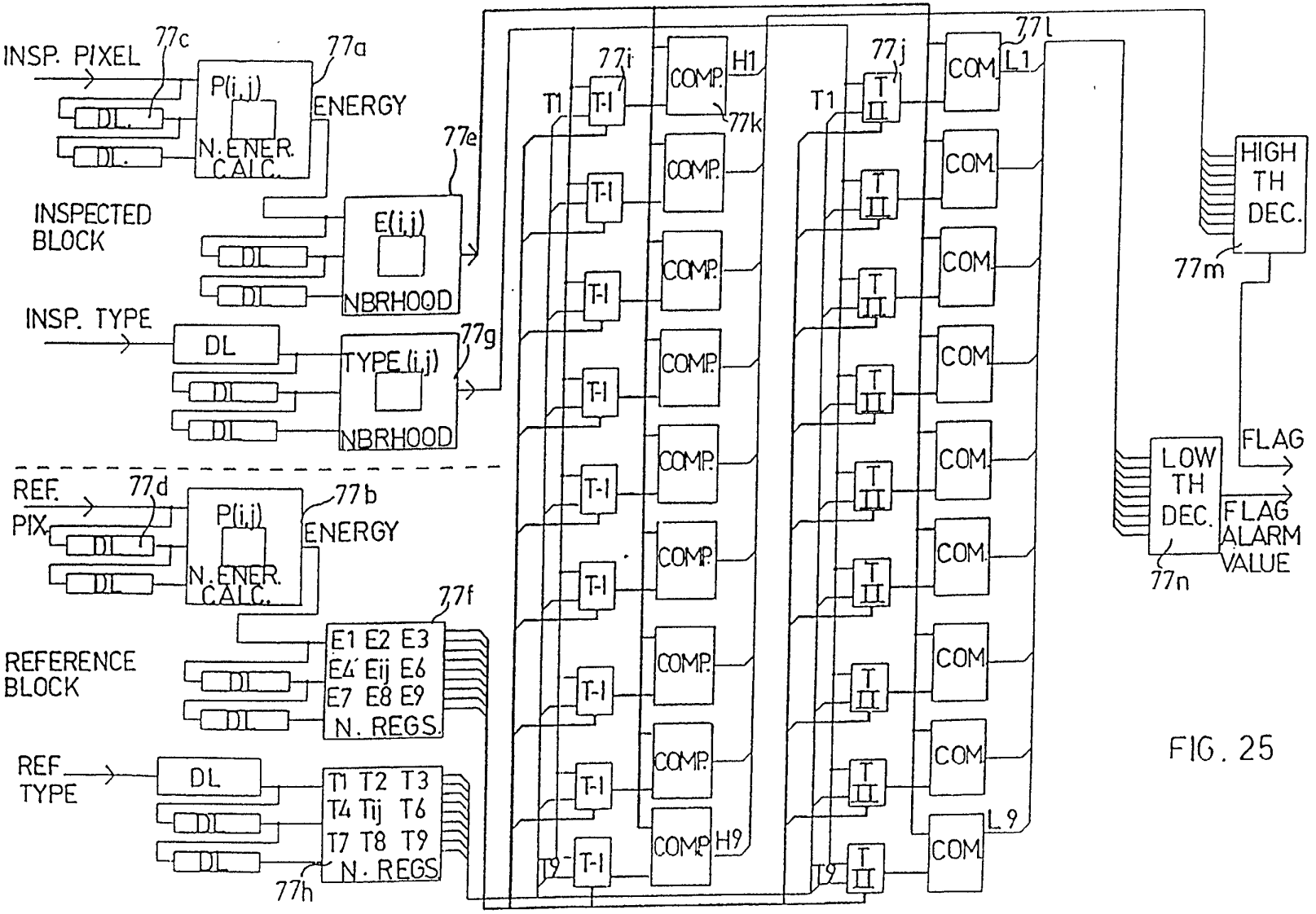


FIG. 25

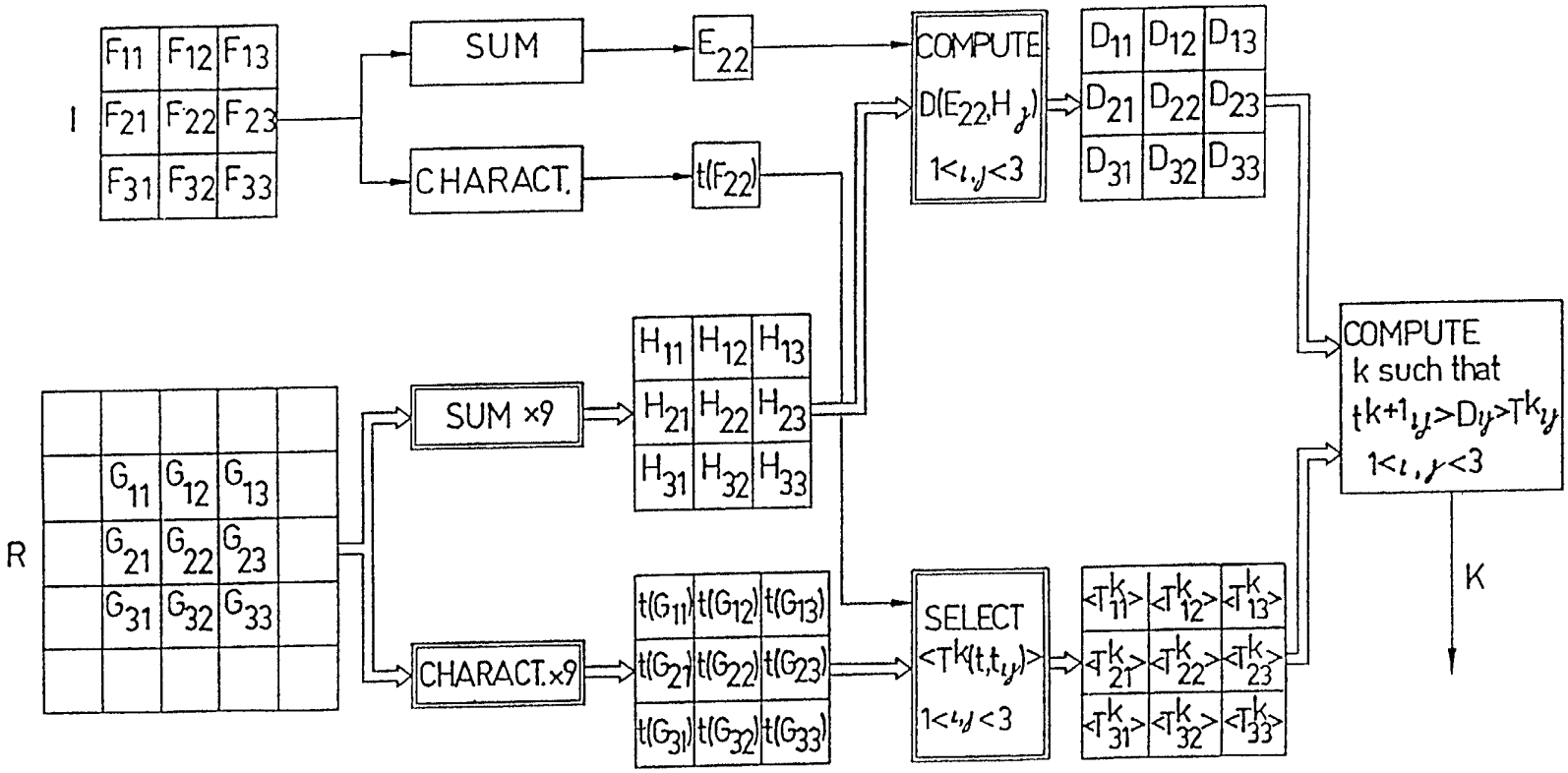

I
F11 F12 F13
F21 F22 F23
F31 F32 F33
SUM
E22
CHARACT.
t(F22)
COMPUTE
D(E22,Hij)
1<i,j<3
D11 D12 D13
D21 D22 D23
D31 D32 D33
R
G11 G12 G13
G21 G22 G23
G31 G32 G33
SUM ×9
H11 H12 H13
H21 H22 H23
H31 H32 H33
CHARACT.×9
t(G11) t(G12) t(G13)
t(G21) t(G22) t(G23)
t(G31) t(G32) t(G33)
SELECT
<Tk(t,tij)>
1<i,j<3
<Tk11> <Tk12> <Tk13>
<Tk21> <Tk22> <Tk23>
<Tk31> <Tk32> <Tk33>
COMPUTE
k such that
tk+1ij>Dij>Tkij
1<i,j<3
K

FIG 25a

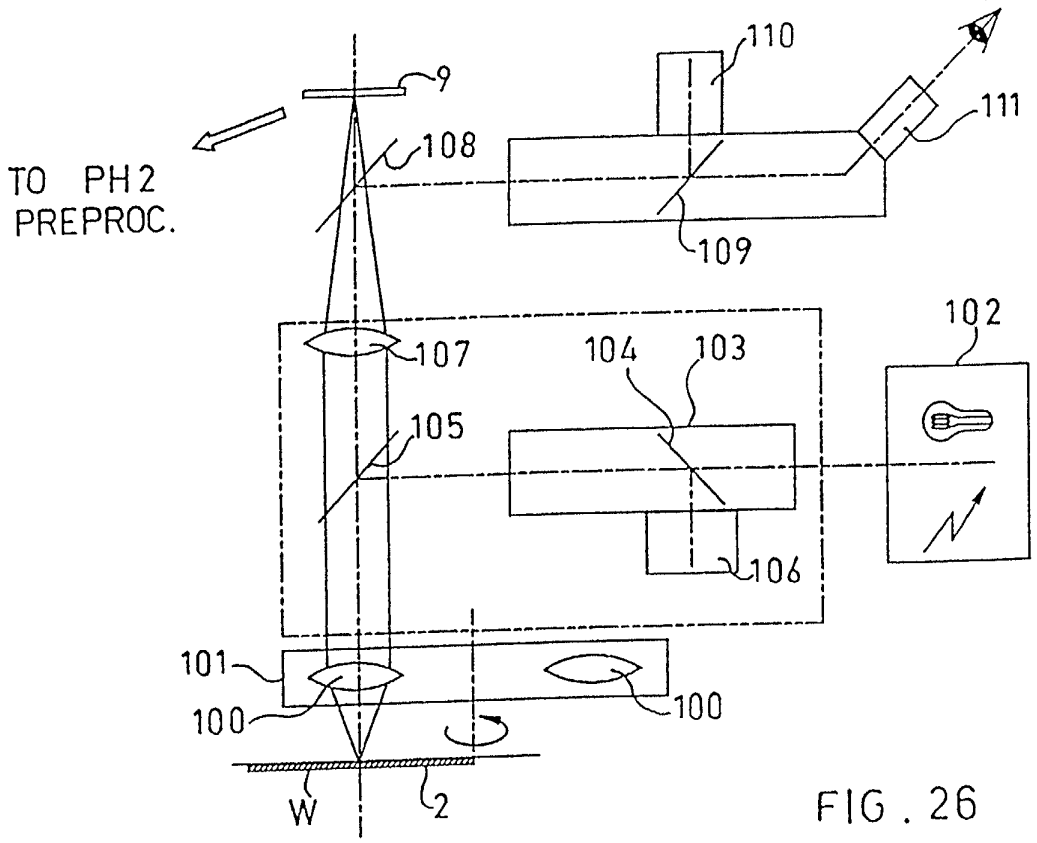

TO PH2
PREPROC.
9
108
110
111
109
107
104
103
102
105
106
101
100
100
W
2

FIG. 26

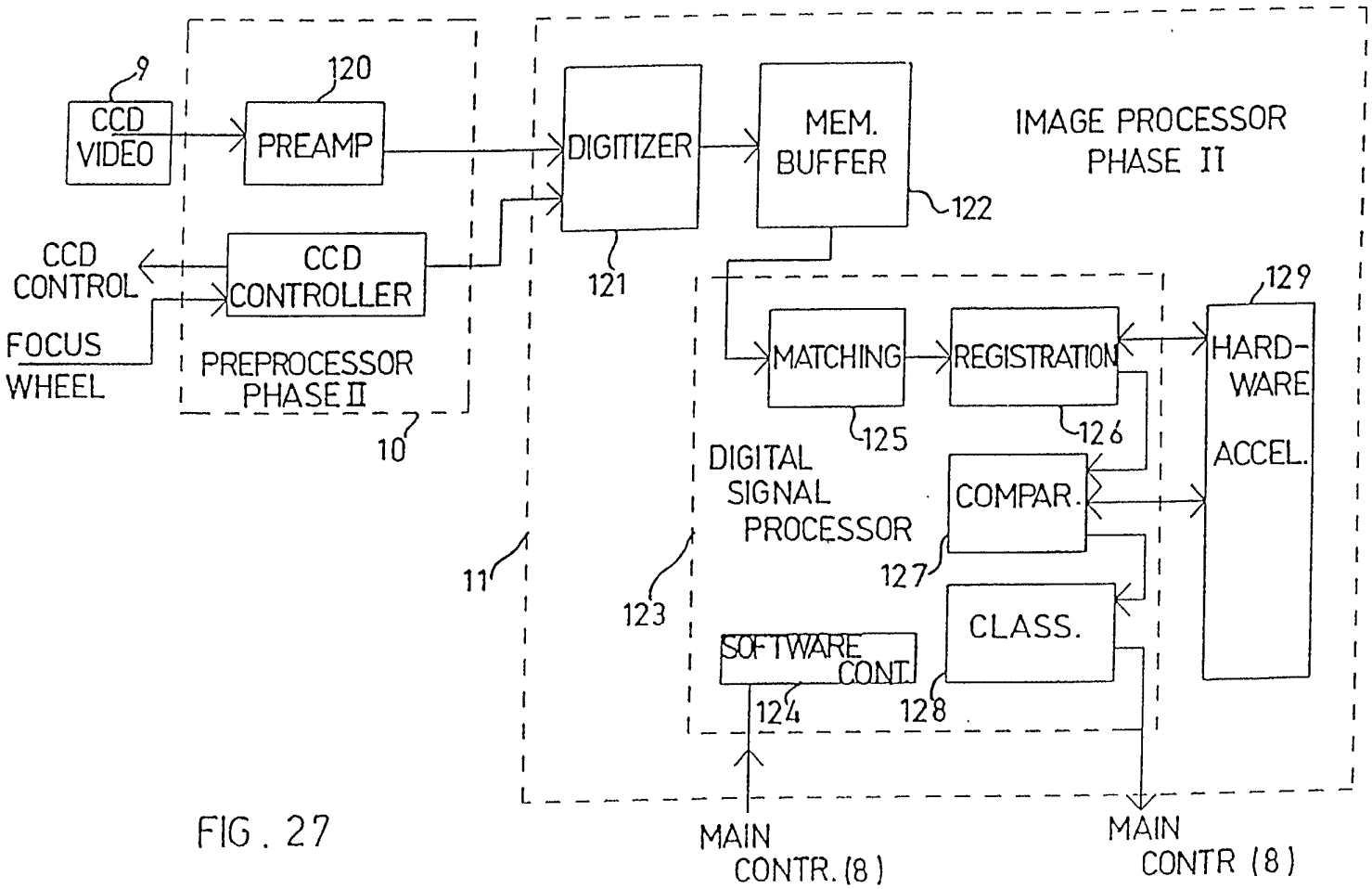


FIG. 27

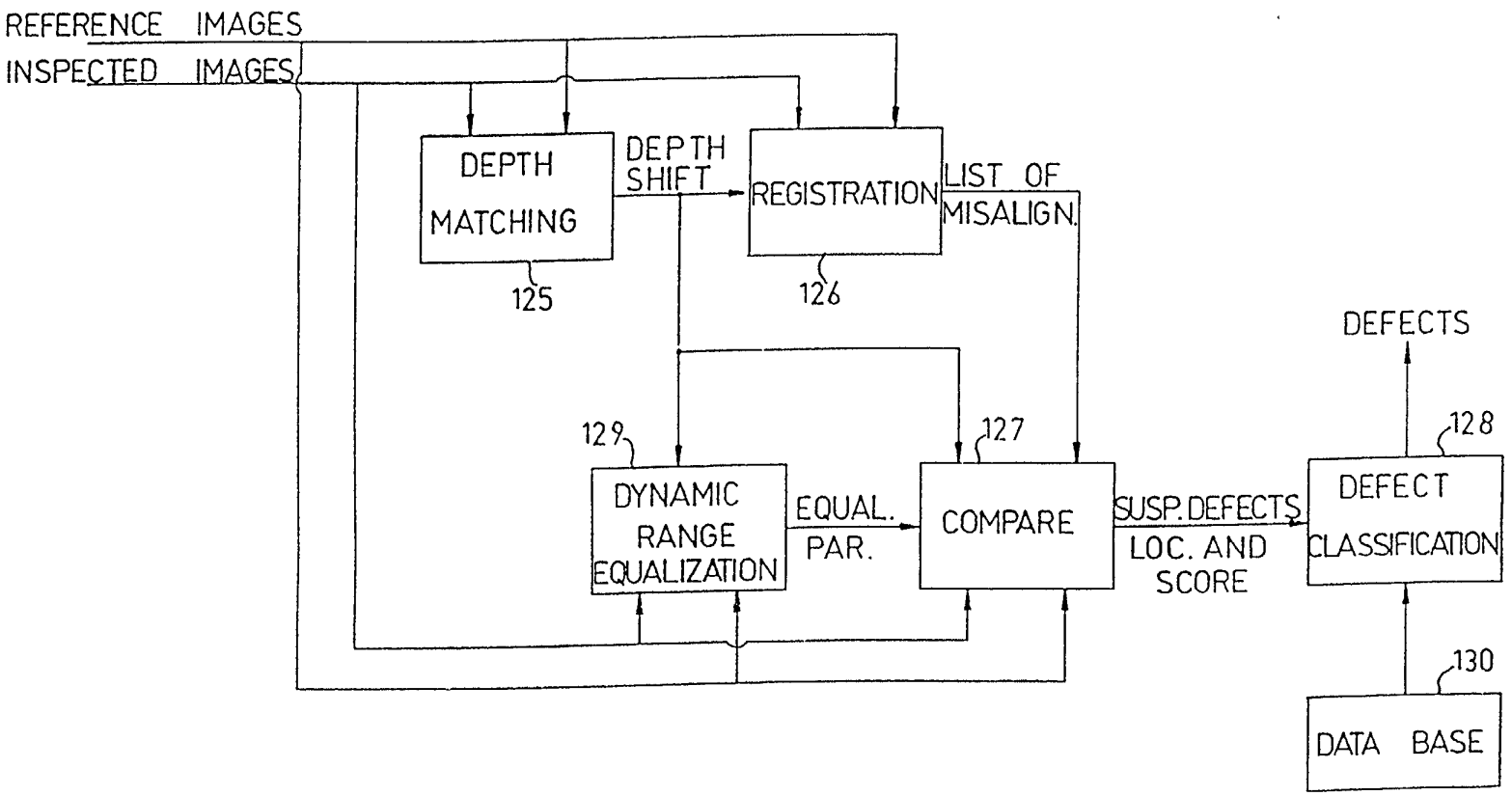

REFERENCE IMAGES
INSPECTED IMAGES
DEPTH MATCHING
125
DEPTH SHIFT
REGISTRATION
126
LIST OF MISALIGN.
DEFECTS
129
127
128
DYNAMIC RANGE EQUALIZATION
EQUAL. PAR.
COMPARE
SUSP. DEFECTS LOC. AND SCORE
DEFECT CLASSIFICATION
130
DATA BASE

FIG. 28

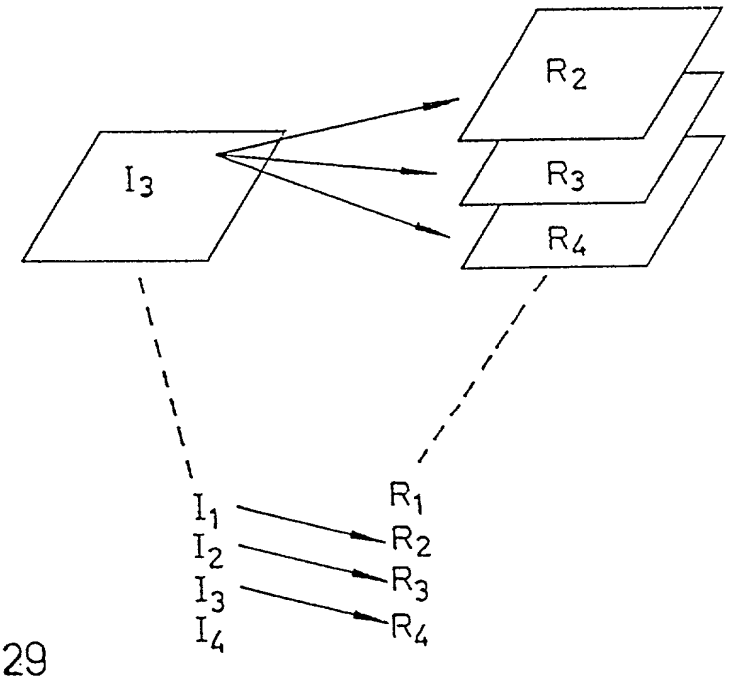


FIG. 29

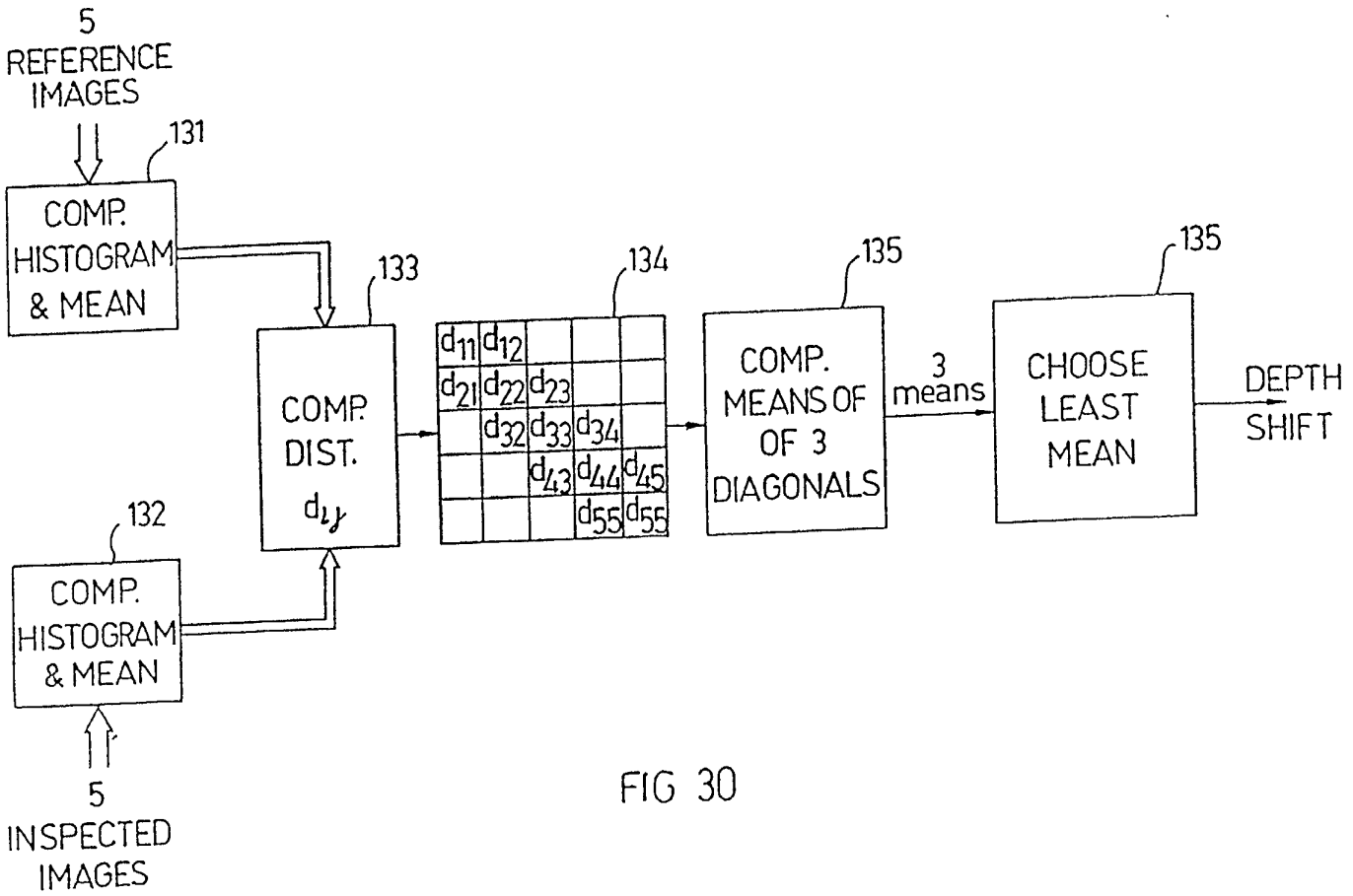


FIG 30

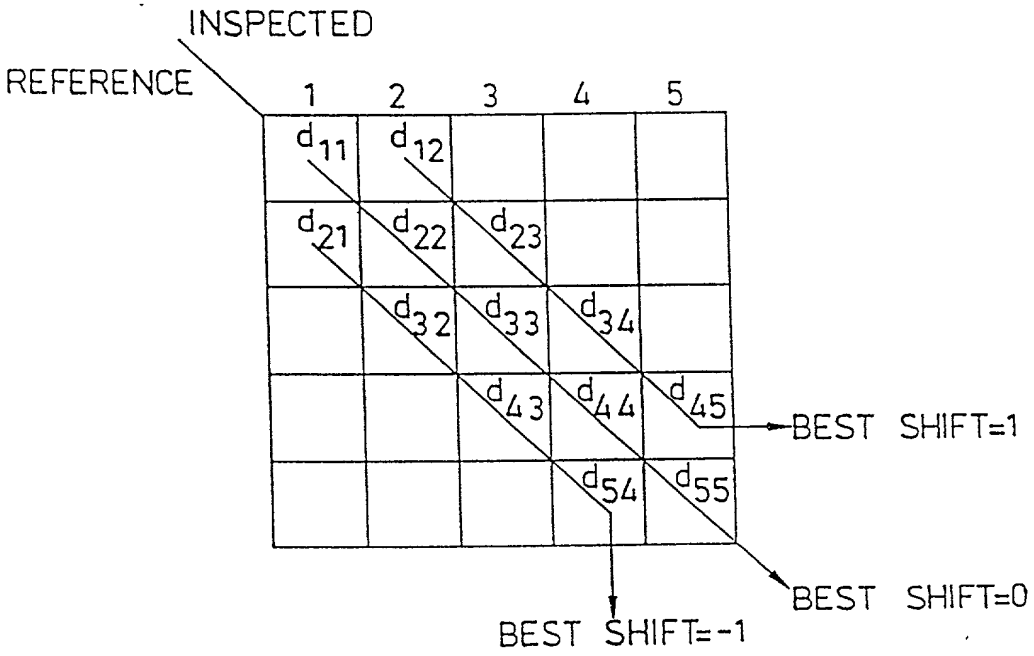

INSPECTED
REFERENCE
1
2
3
4
5
d_{11}
d_{12}
d_{21}
d_{22}
d_{23}
d_{32}
d_{33}
d_{34}
d_{43}
d_{44}
d_{45}
d_{54}
d_{55}
BEST SHIFT=1
BEST SHIFT=0
BEST SHIFT=-1

FIG . 31

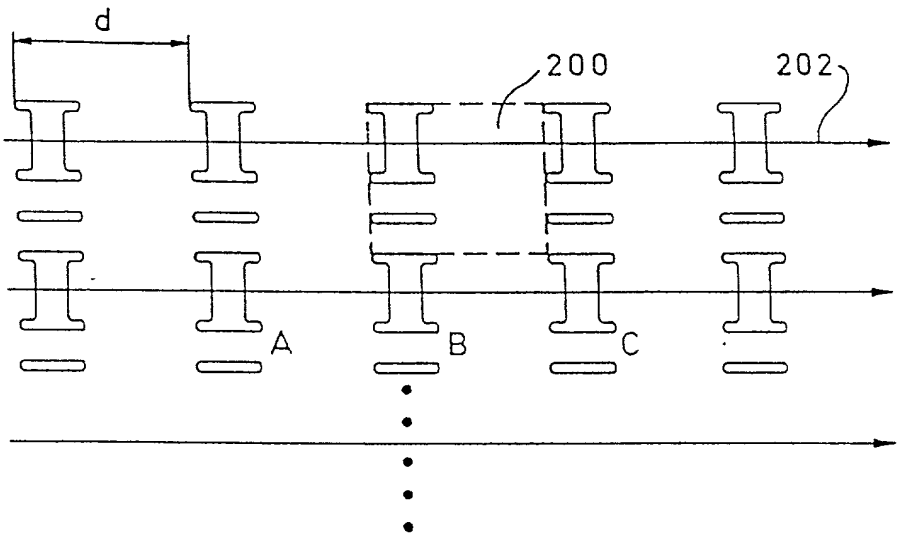


FIG. 32

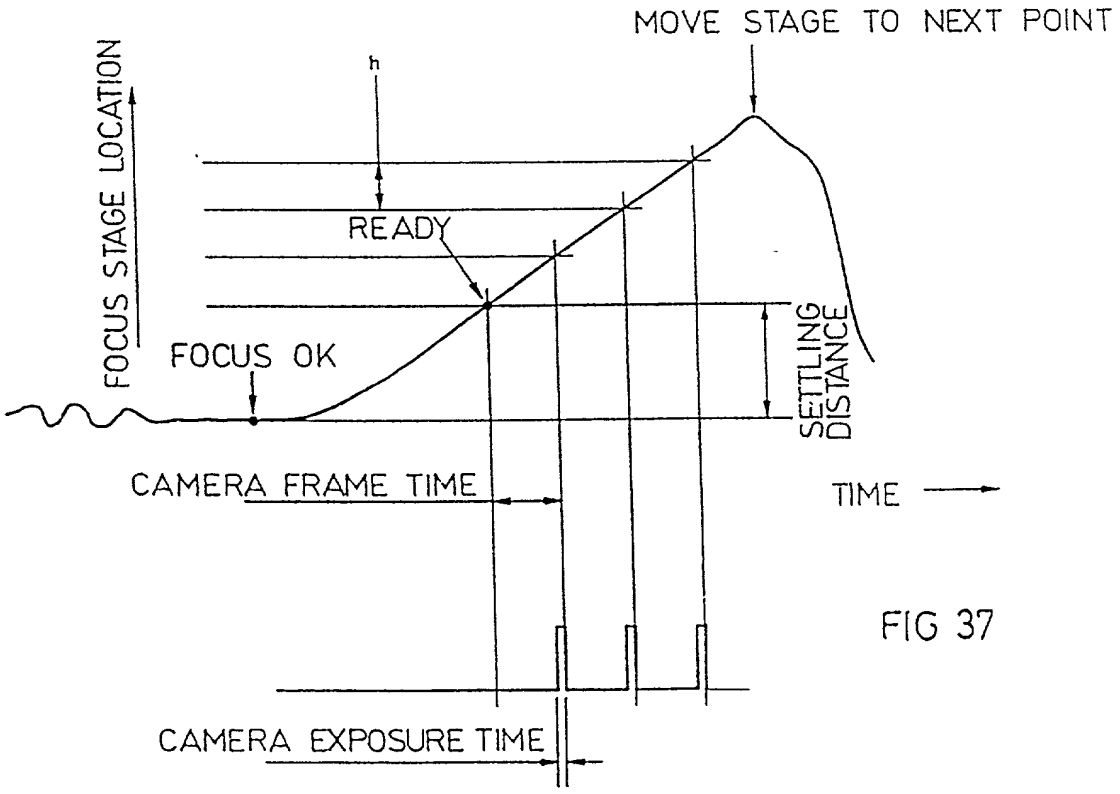


FIG 37

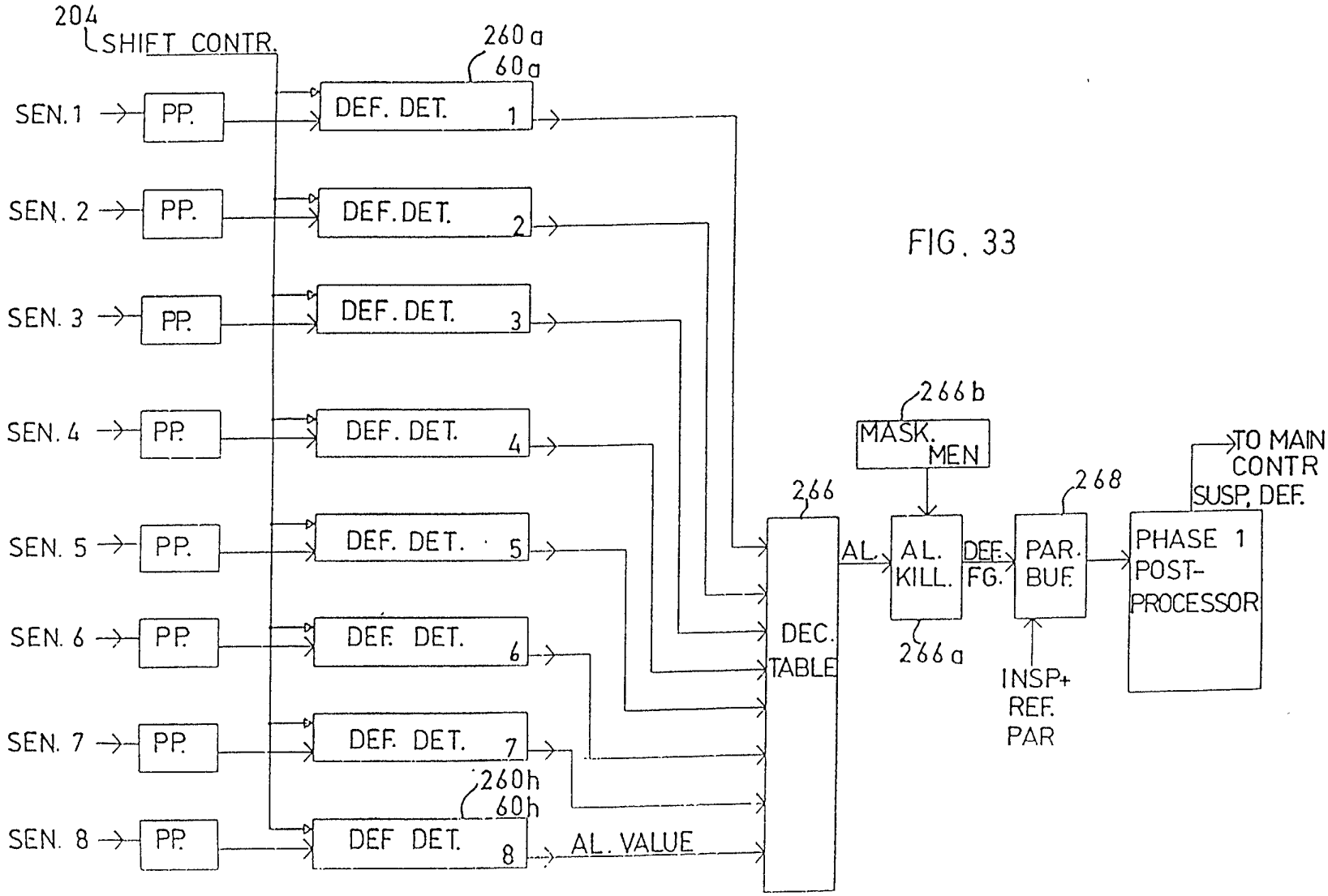

204
SHIFT CONTR.
260a
60a
SEN. 1
PP.
DEF. DET. 1
SEN. 2
PP.
DEF. DET. 2
SEN. 3
PP.
DEF. DET. 3
SEN. 4
PP.
DEF. DET. 4
SEN. 5
PP.
DEF. DET. 5
SEN. 6
PP.
DEF. DET. 6
SEN. 7
PP.
DEF. DET. 7
260h
60h
SEN. 8
PP.
DEF DET. 8
AL. VALUE
266
DEC. TABLE
266b
MASK. MEN
AL.
AL. KILL.
266a
DEF. FG.
268
PAR. BUF.
INSP+ REF. PAR
PHASE 1 POST-PROCESSOR
TO MAIN CONTR SUSP. DEF.

FIG. 33

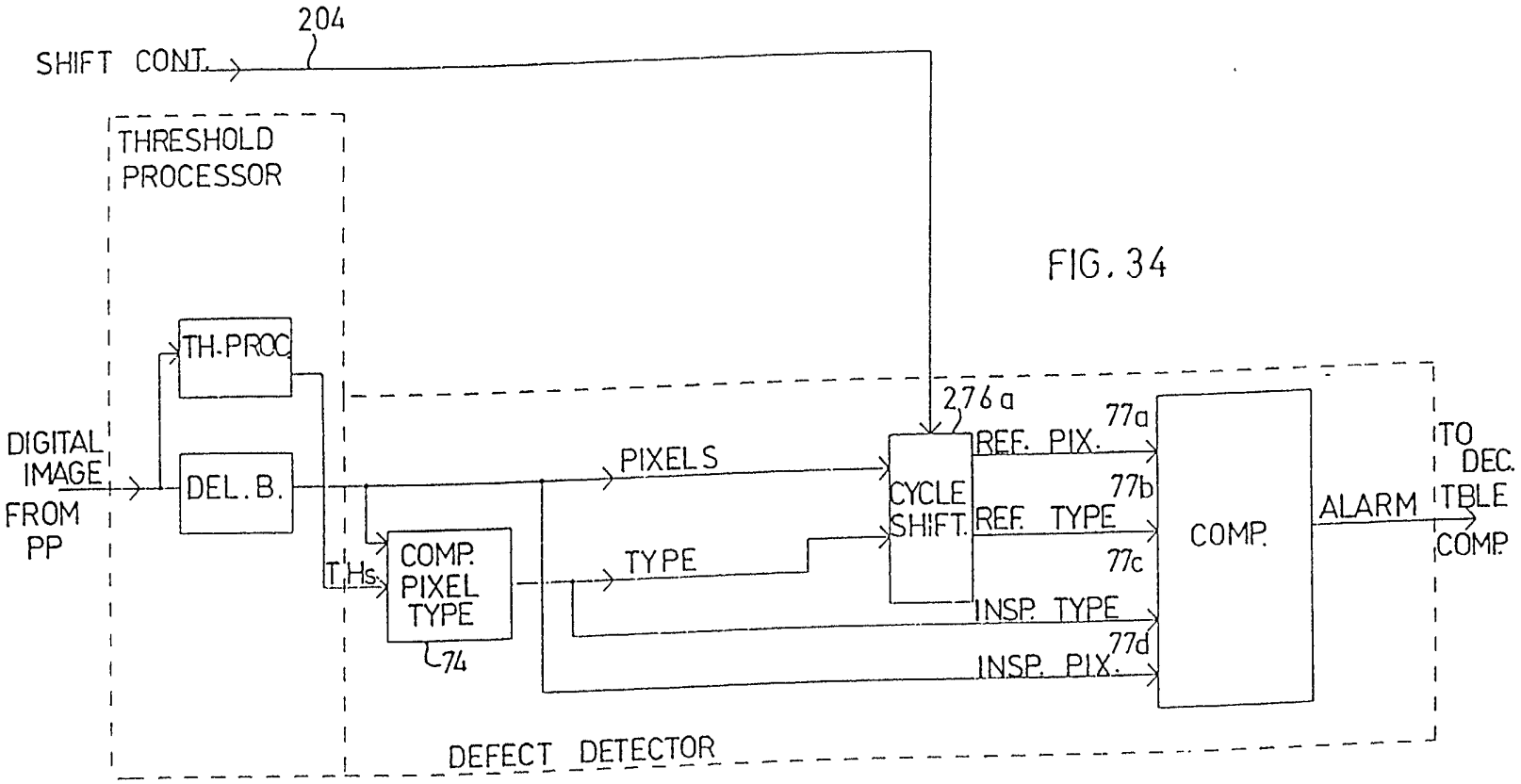


FIG. 34

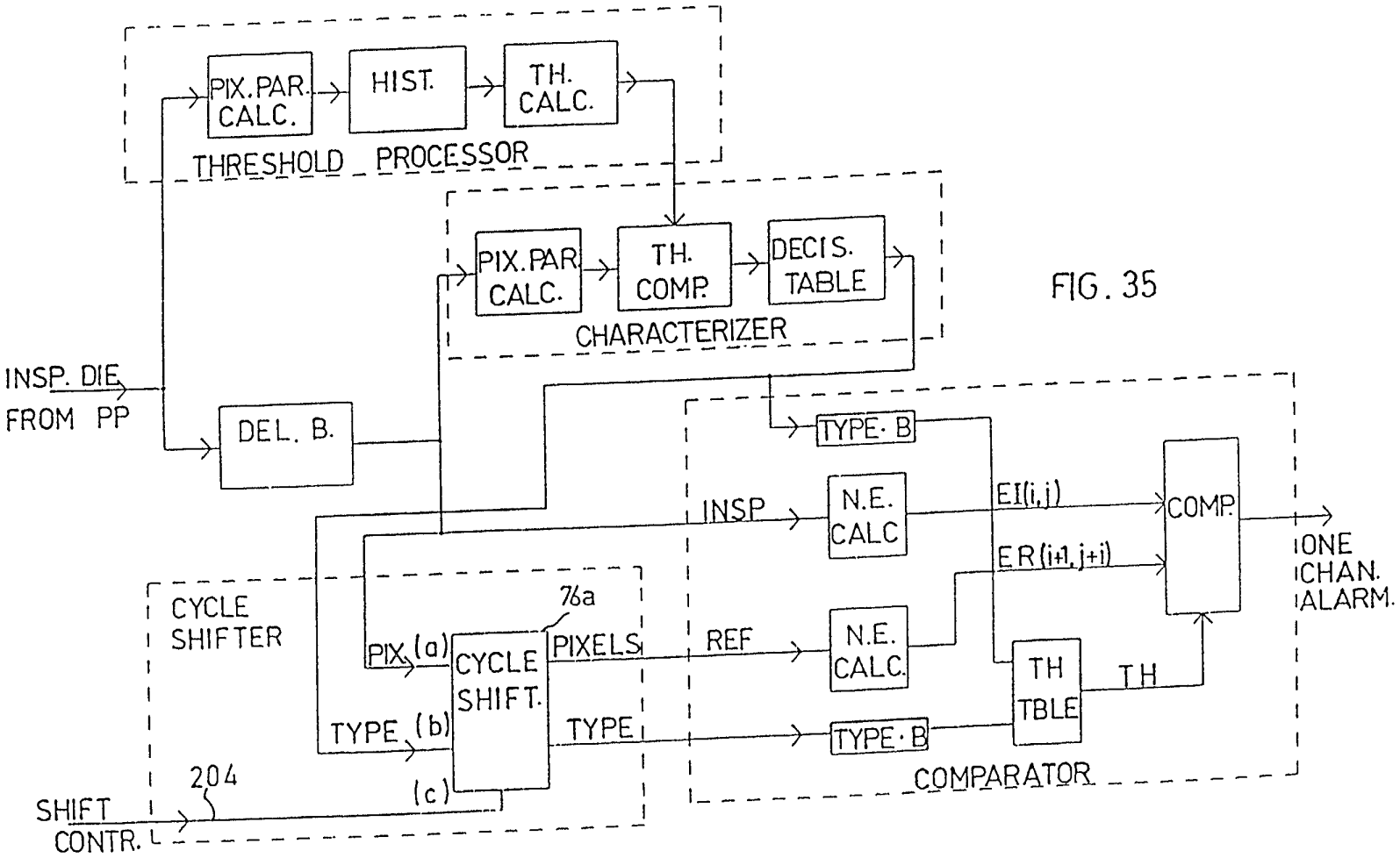


FIG. 35

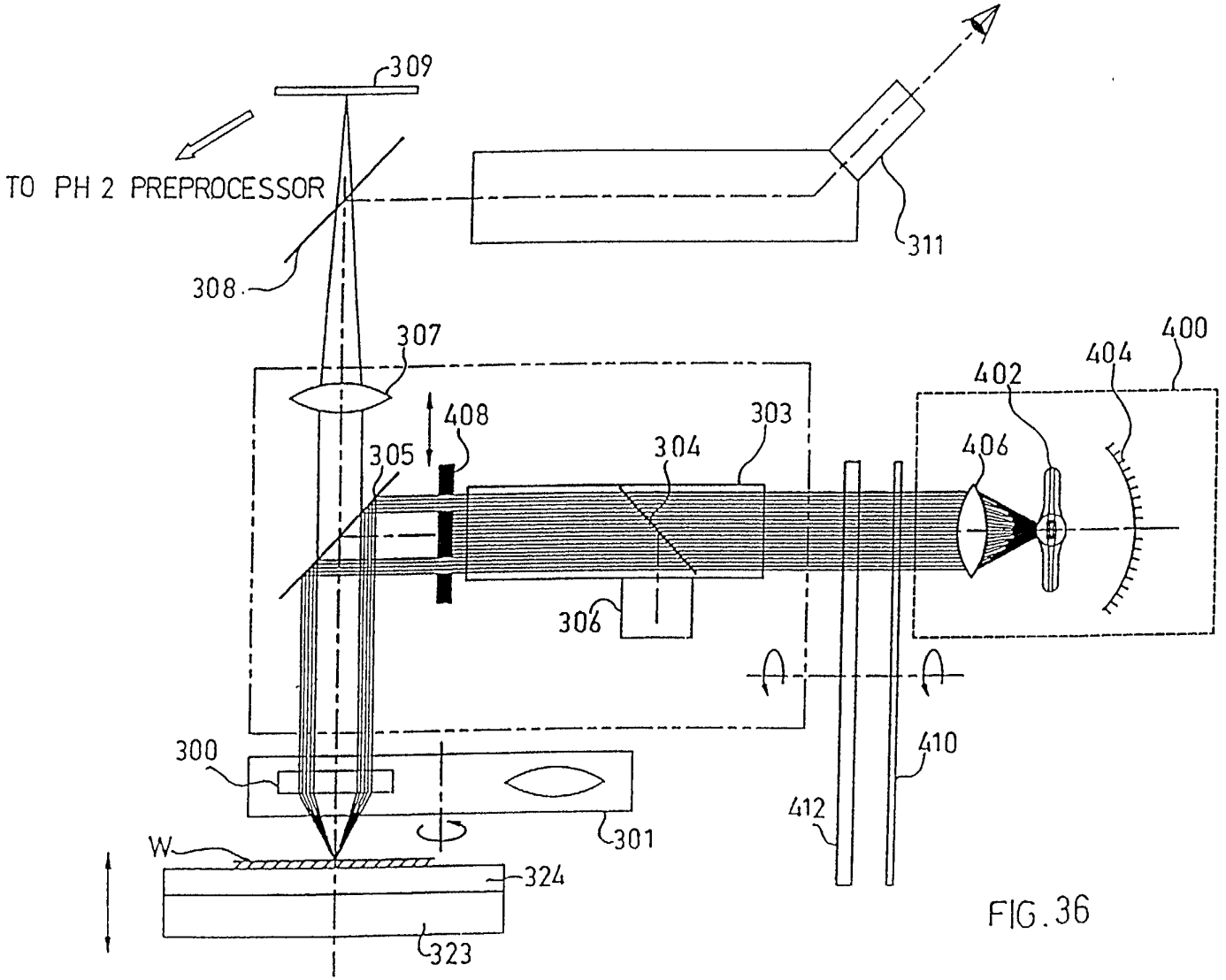

309
TO PH 2 PREPROCESSOR
308
311
307
400
404
402
408
303
305
304
406
308
300
410
412
301
W
324
323

FIG. 36

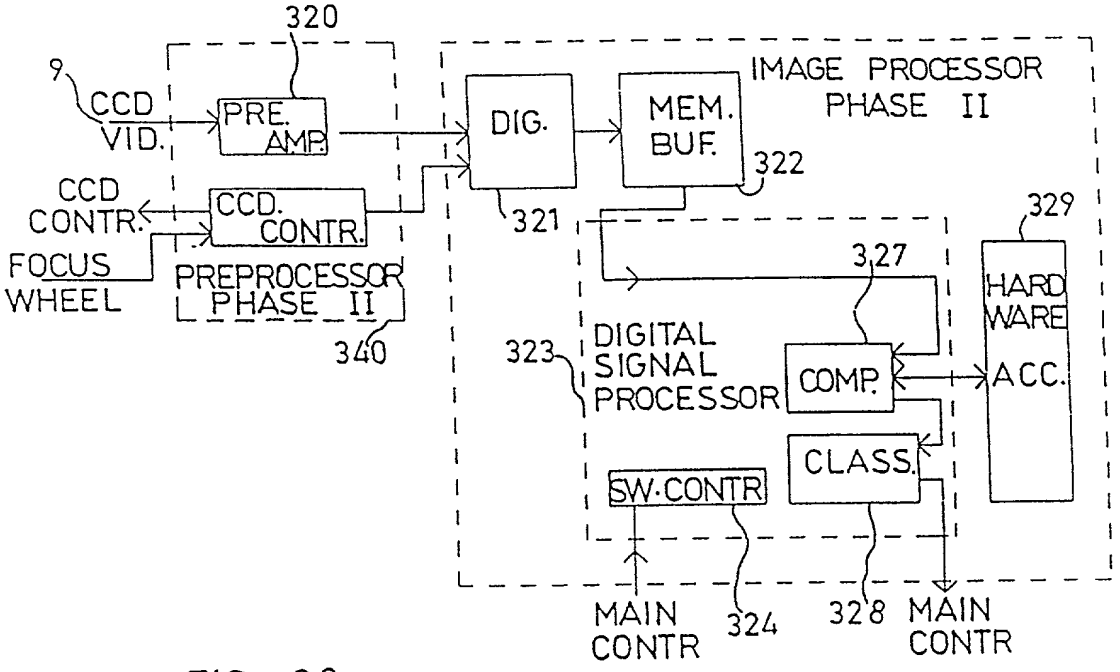

320
9
CCD VID.
PRE. AMP.
DIG.
MEM. BUF.
IMAGE PROCESSOR PHASE II
322
CCD CONTR.
CCD. CONTR.
321
329
FOCUS WHEEL
PREPROCESSOR PHASE II
340
327
HARD WARE
323
DIGITAL SIGNAL PROCESSOR
COMP.
ACC.
CLASS.
SW.CONTR
MAIN CONTR
324
328
MAIN CONTR

FIG . 38

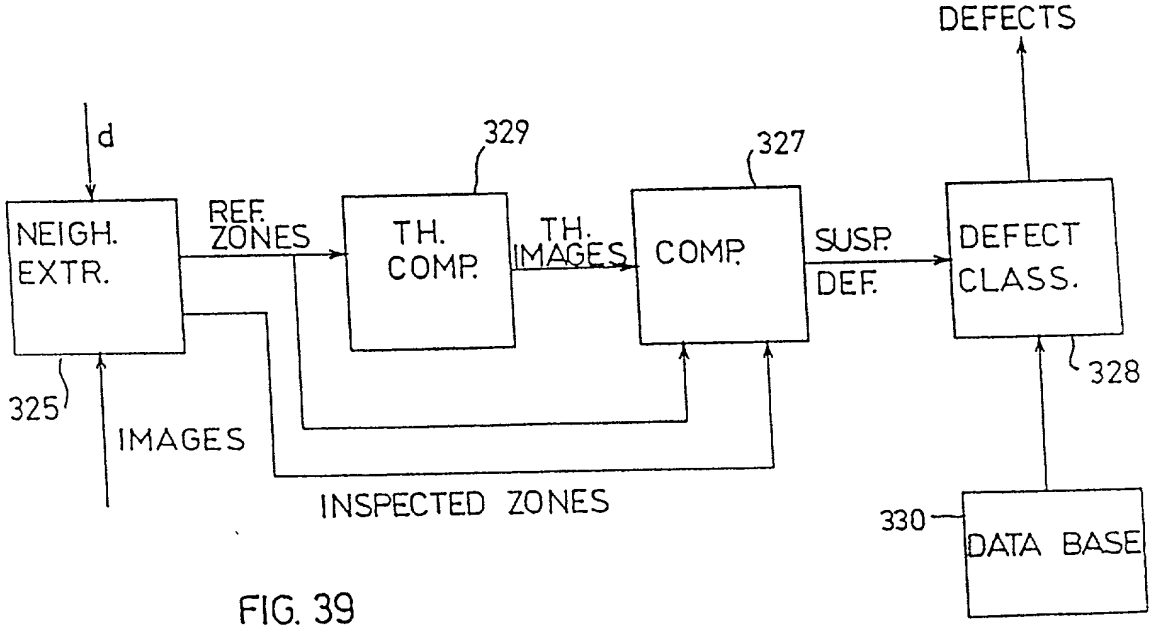

DEFECTS
d
329
327
NEIGH. EXTR.
REF. ZONES
TH. COMP.
TH. IMAGES
COMP.
SUSP. DEF.
DEFECT CLASS.
328
325
IMAGES
INSPECTED ZONES
330
DATA BASE

FIG. 39

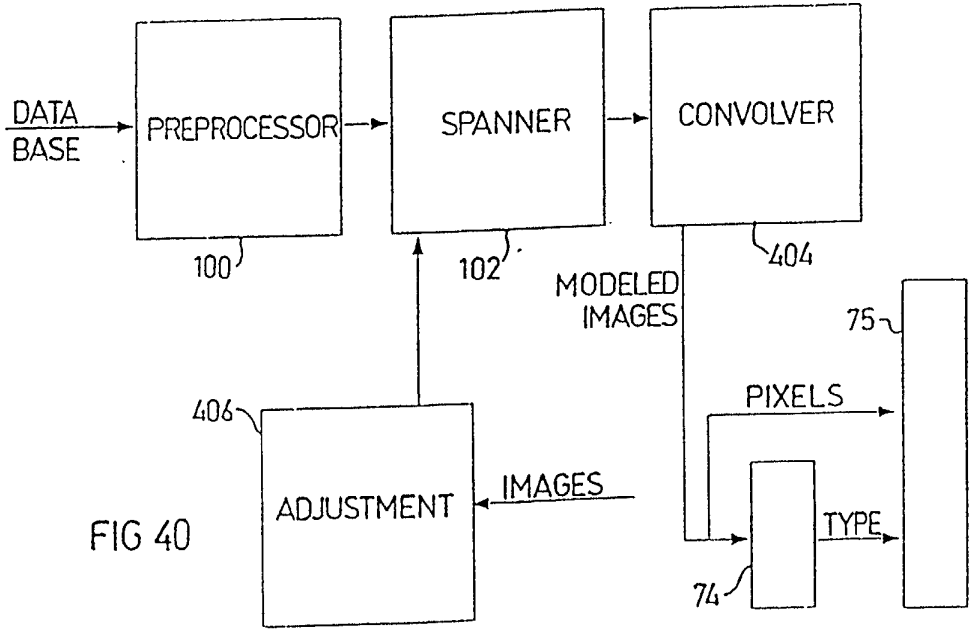


FIG 40

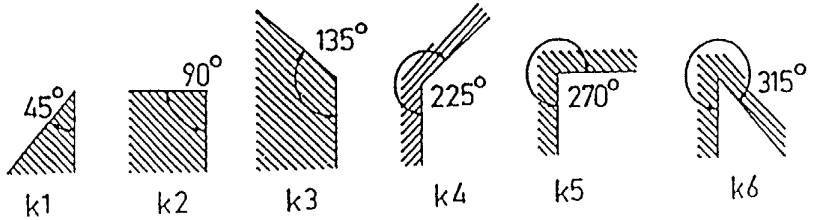


FIG. 41

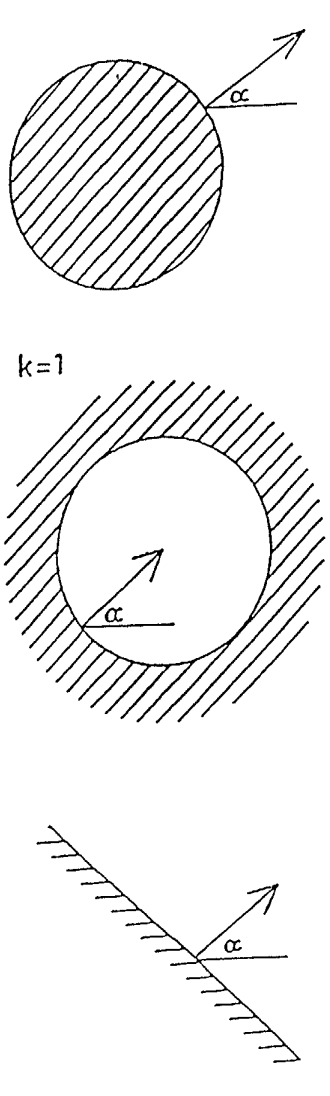


FIG 42

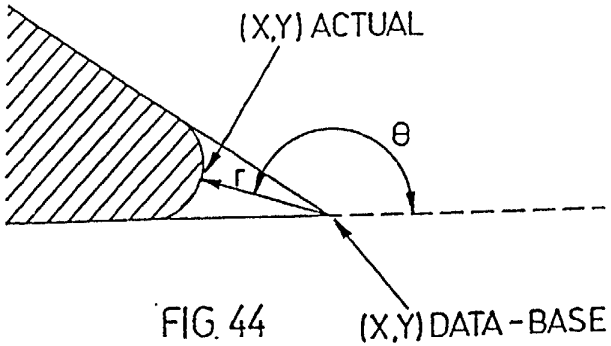


FIG. 44

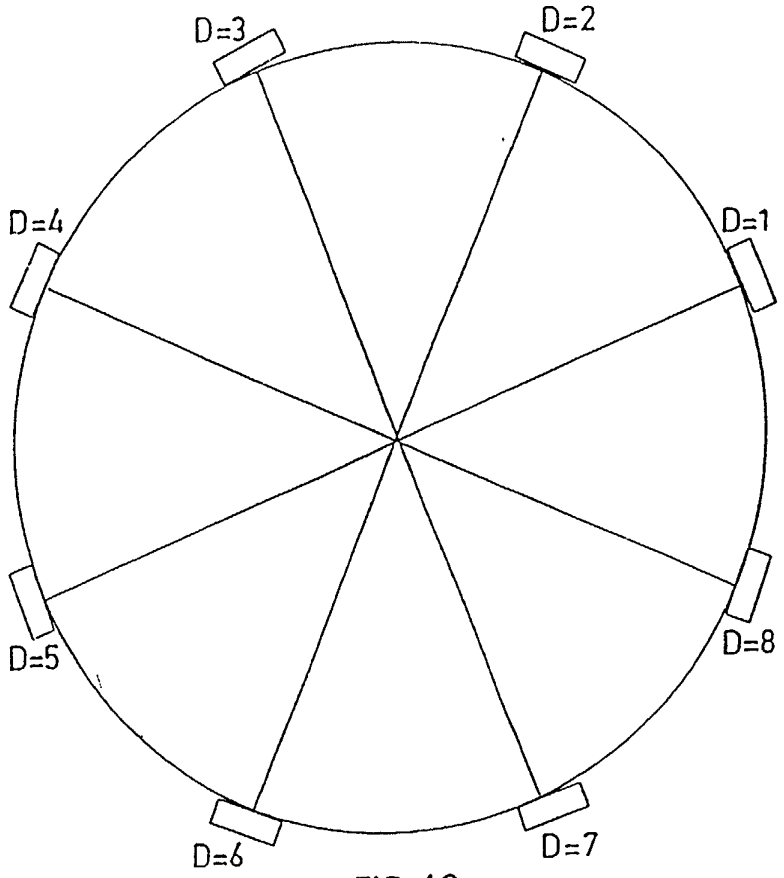


FIG 43

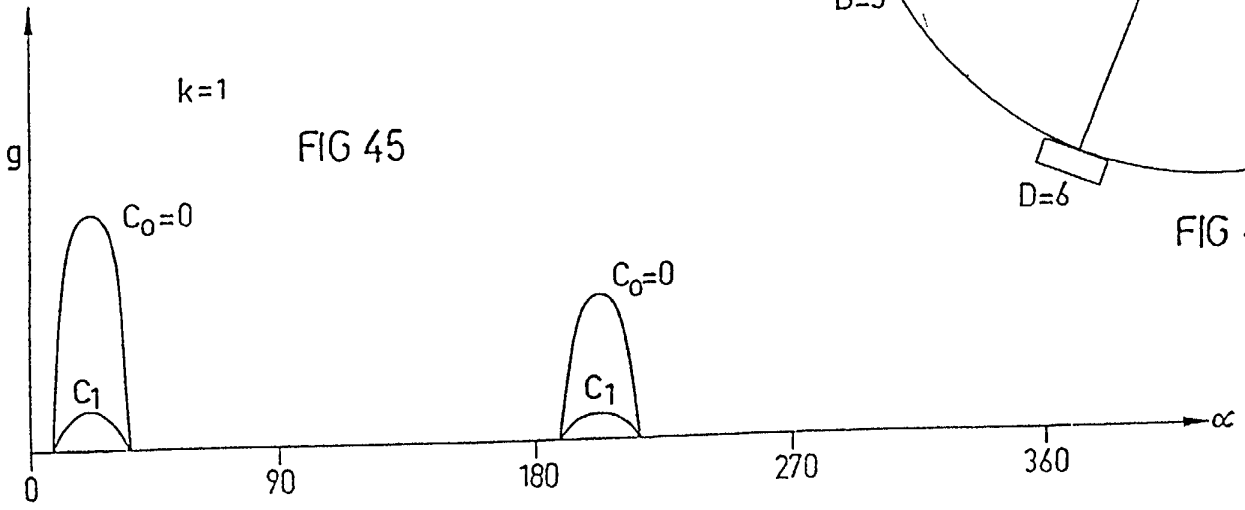


FIG 45

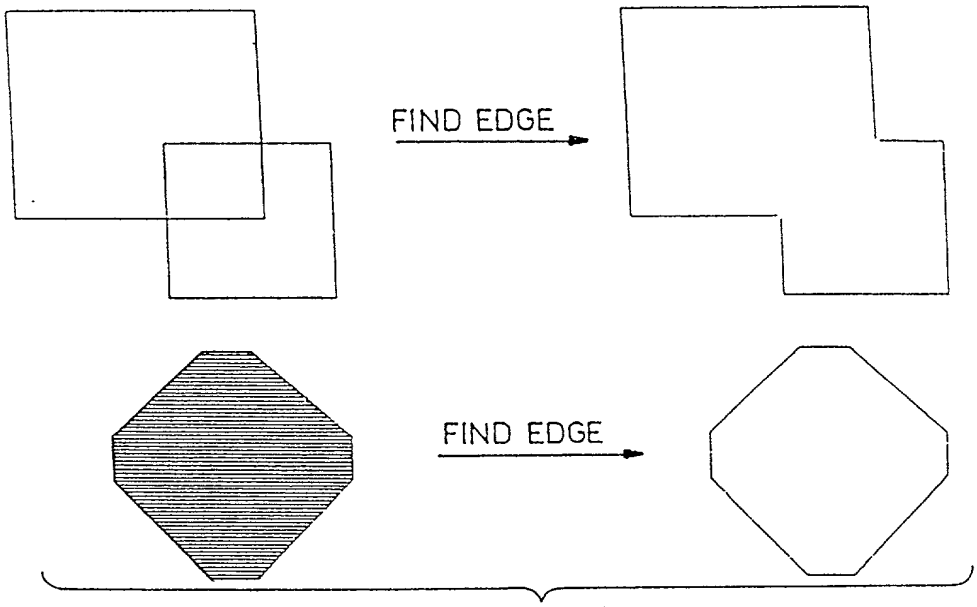


FIG 46

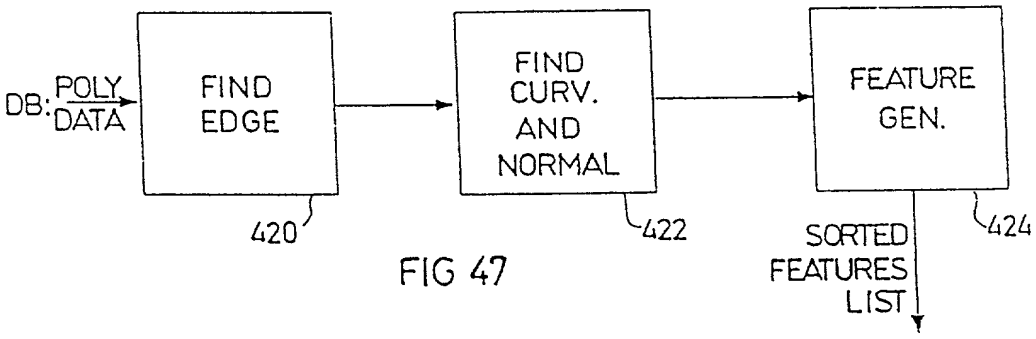


FIG 47

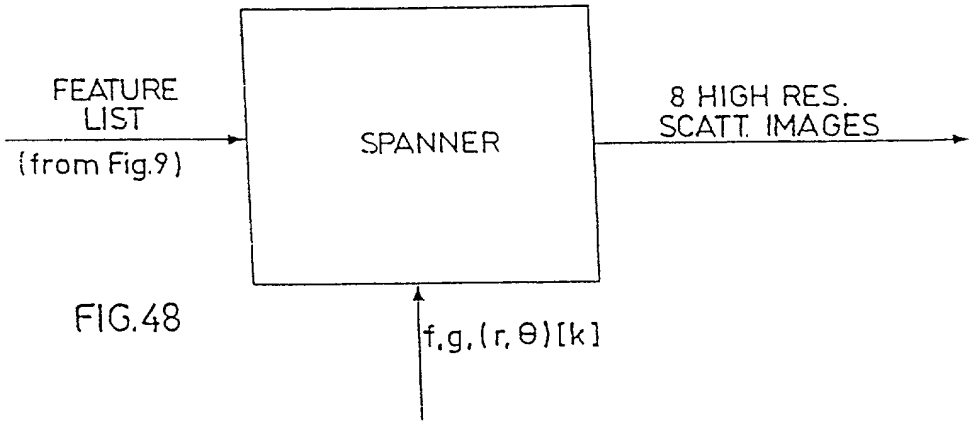


FIG.48

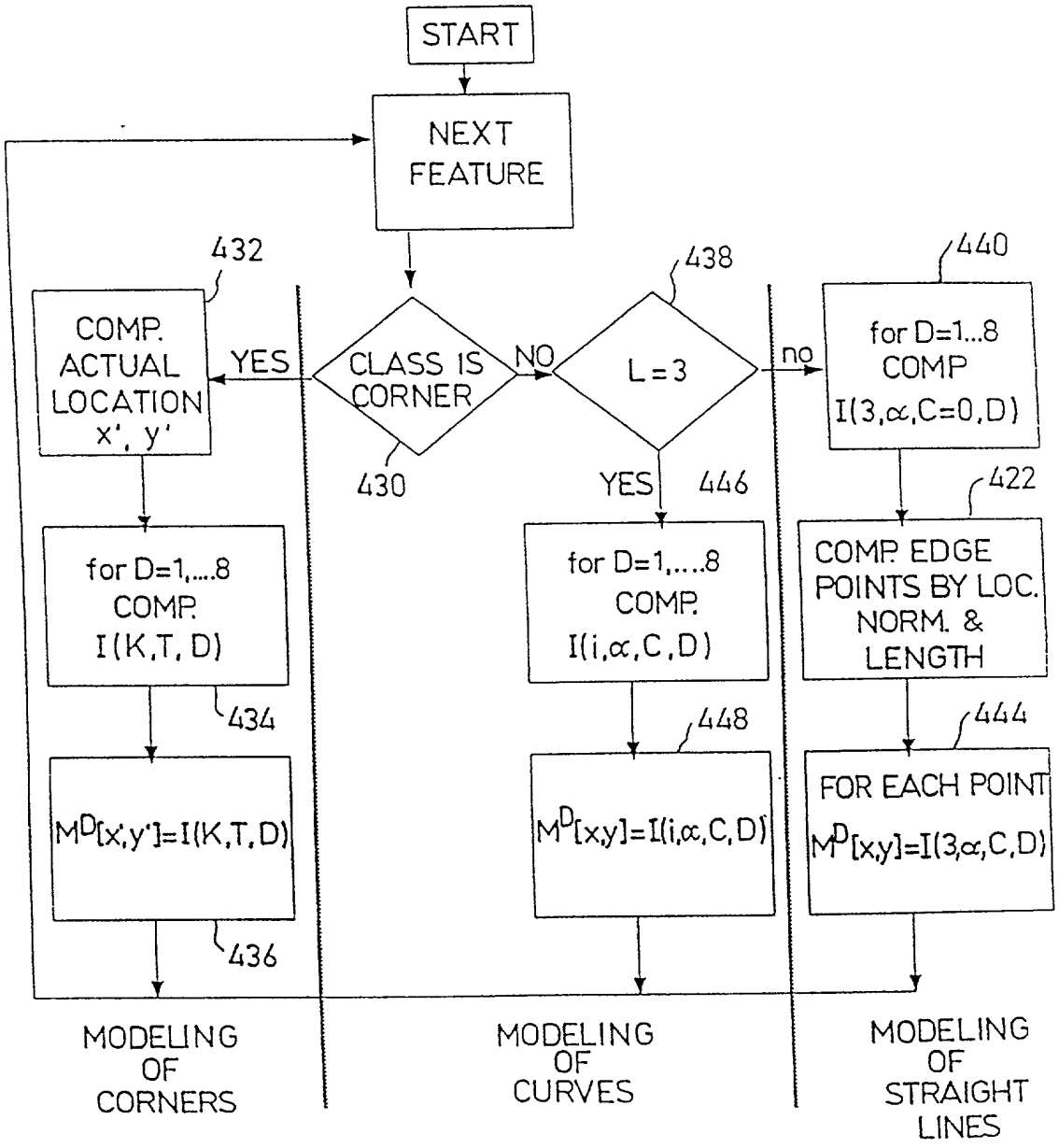

START
NEXT FEATURE
432
COMP. ACTUAL LOCATION x', y'
YES
CLASS IS CORNER
NO
430
438
L=3
no
440
for D=1...8 COMP I(3,α,C=0,D)
YES
446
for D=1,....8 COMP. I(i,α,C,D)
for D=1,....8 COMP. I(K,T,D)
434
M^D[x',y']=I(K,T,D)
436
448
M^D[x,y]=I(i,α,C,D)
422
COMP. EDGE POINTS BY LOC. NORM. & LENGTH
444
FOR EACH POINT M^D[x,y]=I(3,α,C,D)
MODELING OF CORNERS
MODELING OF CURVES
MODELING OF STRAIGHT LINES

FIG 49